GEOGRAPHY & INDUSTRY

The EDISON ELECTRIC INSTITUTE BULLETIN

March
1954

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ublished Monthly by
Edison Electric
Institute

Outlook for Securities
Walter H. Sammis

Future of Electric Heating
George E. Whitwell

Employee Opinion Surveys
George P. Massengale

What They Were Saying in 1879, 1904 and 1929

Sales and Accounting Conference Programs

Fifty Million Customers

ELECTRICAL RESEARCH STATISTICS
THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

December, 1952-1953

SOURCE AND DISPOSAL OF ENERGY—MONTH OF DECEMBER

	1953	1952	%
GENERATION* (Net)			
By Fuel Burning Plants	30,394,668,000	28,278,756,000	+ 7.5
By Water Power Plants	8,667,568,000	8,257,167,000	+ 5.0
Total Generation	**39,062,236,000**	**36,535,923,000**	**+ 6.9**
Add—Net Imports Over International Boundaries	35,809,000	114,776,000	−68.8
Less—Company Use	131,064,000	137,274,000	− 4.5
Less—Energy Used by Producer	643,185,000	831,246,000	−22.6
Net Energy for Distribution	**38,323,796,000**	**35,682,179,000**	**+ 7.4**
Lost and Unaccounted for	5,284,117,000	5,006,518,000	+ 5.5
Sales to Ultimate Customers	**33,039,679,000**	**30,675,661,000**	**+ 7.7**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of December 31			
Residential or Domestic	41,981,633	40,747,518	+ 3.0
Rural (Distinct Rural Rates)	1,621,810	1,663,201	− 2.5
Commercial or Industrial:			
Small Light and Power	5,863,210	5,634,130	+ 4.1
Large Light and Power	271,947	256,294	+ 6.1
Other Customers	160,465	158,228	+ 1.4
Total Ultimate Customers	**49,899,065**	**48,459,371**	**+ 3.0**
KILOWATTHOUR SALES—During Month of December			
Residential or Domestic	9,104,184,000	8,258,822,000	+10.2
Rural (Distinct Rural Rates)	583,410,000	525,332,000	+11.1
Commercial or Industrial:			
Small Light and Power	5,926,932,000	5,413,857,000	+ 9.5
Large Light and Power	15,764,525,000	14,888,237,000	+ 5.9
Street and Highway Lighting	394,401,000	363,476,000	+ 8.5
Other Public Authorities	778,426,000	714,347,000	+ 9.0
Railways and Railroads:			
Street and Interurban Railways	255,600,000	280,852,000	− 9.0
Electrified Railroads	189,001,000	198,788,000	− 4.9
Interdepartmental	43,200,000	31,950,000	+35.2
Total to Ultimate Customers	**33,039,679,000**	**30,675,661,000**	**+ 7.7**
Revenue from Ultimate Customers	**$589,705,300**	**$550,591,500**	**+ 7.1**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—For 12 months ended December 31			
Kilowatthours per Customer	2,345	2,169	+ 8.1
Average Annual Bill	$64.25	$60.08	+ 6.9
Revenue per Kilowatthour	2.74¢	2.77¢	− 1.1

*By Courtesy of the Federal Power Commission.

THE EDISON ELECTRIC INSTITUTE BULLETIN is published monthly by the Edison Electric Institute, an association of electric light and power companies in the United States and its territorial possessions. Its affiliate members consist of members of the Canadian Electrical Association.

The objectives of the Edison Electric Institute are:

The advancement in the public service of the art of producing, transmitting, and distributing electricity and the promotion of scientific research in such field.

The ascertainment and making available to the members and the public of factual information, data, and statistics relating to the electric industry.

To aid its operating company members to generate and sell electric energy at the lowest possible price commensurate with safe and adequate service, giving due regard to the interests of consumer, investor, and employee.

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The EDISON ELECTRIC INSTITUTE BULLETIN

March, 1954

Vol. 22 No. 3

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CONVENTIONS AND MEETINGS

1954

MARCH

1- 5 CEA Western Division, Winnipeg, Man.

4- 5 PEA Winter Meeting, Relay Committee, Benjamin Franklin Hotel, Philadelphia, Pa.

10-12 ASME International Meeting, Hotel Del Prado, Mexico City, Mex.

18 EEI Industrial Relations Committee, EEI Headquarters, New York, N. Y.

18-19 Pacific Coast Electrical Association Engineering and Operating Section Meeting, Mark Hopkins Hotel, San Francisco, Calif.

19 ECAP Management Group Meeting, Roosevelt Hotel, New Orleans, La.

21-23 Controllers Institute of America Eastern Conference, Sheraton Park Hotel, Washington, D. C.

22-24 Southeastern Electric Exchange 21st Annual Meeting, Boca Raton Hotel, Boca Raton, Fla.

24-26 American Power Conference, Sherman Hotel, Chicago, Ill.

25-26 Oklahoma Utilities Association Annual Convention, Biltmore Hotel, Oklahoma City, Okla.

29-30 Power Station Chemistry Subcommittee of EEI Prime Movers Committee, Deschler Hilton Hotel, Columbus, Ohio

APRIL

5- 6 14th Annual Young Men's Utility Conference, sponsored by Indiana Electric Association, Gary Hotel, Gary, Ind.

5- 8 20th Annual EEI Sales Conference, Edgewater Beach Hotel, Chicago, Ill.

7- 8 Pacific Coast Electrical Association, Administration Services Section, Hotel Claremont, Berkeley, Calif.

7- 9 Missouri Valley Electric Association Engineering Conference, President Hotel, Kansas City, Mo.

8- 9 IES Southern Regional Conference, Roosevelt Hotel, New Orleans, La.

11-14 IES Southwestern Regional Conference, Rice Hotel, Houston, Tex.

12-14 EEI-AGA Accounting Conference, Hotel Statler, Boston, Mass.

13 EEI Area Development Committee, Hotel Roosevelt, New York, N. Y.

15 EEI Industrial Relations Committee, Netherland Plaza Hotel, Cincinnati, Ohio

15-16 IES Inter-Mountain Regional Conference, Denver, Colo.

19-20 IES South Pacific Coast Regional Meeting, Museum of Art, San Francisco, Calif.

22-23 IES Pacific Northwest Regional Meeting, Benjamin Franklin Hotel, Seattle, Wash.

26-27 NCEA Accounting Meeting, Dyckman Hotel, Minneapolis, Minn.

28 EEI Financing and Investor Relations Committee, EEI Headquarters, New York, N. Y.

28-30 IES Canadian Regional Meeting, King Edward Hotel, Toronto, Ont.

29 NAEC Annual Meeting, Mayflower Hotel, Washington, D. C.

1954

MAY

3- 4 IES Great Lakes Regional Meeting, Sheraton Cadillac Hotel, Detroit, Mich.

3- 5 EEI Engineering Committees, Edgewater Beach Hotel, Chicago, Ill.
3-4 Meter and Service; Prime Movers; Electrical Equipment.
4-5 Hydraulic Power; Transmission and Distribution.

3- 5 EEI Purchasing and Stores Committee, Hotel Roosevelt, New York, N. Y.

11 EEI Commercial Electric Cooking Conference, Sheraton Hotel, Chicago, Ill.

13-14 PUAA Annual Convention, Hotel Statler, Boston, Mass.

18 IES Northeastern Regional Conference, Hotel Bond, Hartford, Conn.

19-21 Pacific Coast Electrical Association Annual Convention, Hotel Del Coronado, Coronado, Calif.

JUNE

1- 3 EEI ANNUAL CONVENTION, Atlantic City, N. J.

3- 5 Controllers Institute of America Western Conference, Empress Hotel, Victoria, B. C.

14 NARUC Executive Committee, Washington, D. C.

14-19 ASCE Convention, Chalfonte Haddon Hall, Atlantic City, N. J.

17-19 IES Midwestern Regional Meeting, Hotel Jefferson, St. Louis, Mo.

24-26 CEA Annual Convention, Murray Bay, Quebec, Que.

27-30 Michigan Electrical Association Annual Convention, Grand Hotel, Mackinac Island, Mich.

JULY

1- 3 EEI Accident Prevention Committee, Mark Hopkins Hotel, San Francisco, Calif.

12-13 EEI Industrial Relations Committee Joint Meeting with Personnel Section of Northwest Electric Light and Power Association, Hotel Multnomah, Portland, Ore.

SEPTEMBER

14-17 EEI-AGA Accounting Division Organization Meeting, Hotel Cleveland, Cleveland, Ohio.

27-29 EEI Industrial Relations Committee, Round-Table Conference, Palmer House, Chicago, Ill.

OCTOBER

6- 8 Indiana Electric Association Annual Convention, French Lick Springs Hotel, French Lick, Ind.

10-13 Controllers Institute of America, Annual Meeting, Edgewater Beach Hotel, Chicago, Ill.

18-22 ASCE Annual Convention, Hotel Statler, New York, N. Y.

28-29 PIP Workshop Conference, Chase Park Plaza Hotel, St. Louis, Mo.

The EDISON ELECTRIC INSTITUTE
BULLETIN

The Outlook for Electric Light and Power Company Securities

Walter H. Sammis
President, Ohio Edison Company, and President, Edison Electric Institute

An address before a meeting of the New York Society of Security Analysts, New York, N. Y., February 8, 1954

WHENEVER it is expected that there will be a change in the trend of business, investors and their advisers endeavor to analyze the effect of such a change upon the securities of various industries. I shall endeavor to review a few fundamentals that should help in the analysis of electric light and power company securities.

There can be no question that 1954 will be a year of economic readjustment. To what extent business may slow down and how long before the pendulum shall swing upward again are matters of varied opinion. Not being an economist, I shall content myself with merely calling attention to a summary of the discussions by leading economists at the National Industrial Conference Board Economic Forum on November 30, 1953, which indicates that the readjustment in 1954 will be of the magnitude of 5 to 7 per cent in gross national product and 10 to 15 per cent in the FRB Index of Manufactures.

In the year 1938, a so-called recession year, gross national product dropped 6.1 per cent from the level of 1937, and the FRB Index of Manufactures dropped 26 index points or 23 per cent. However, the composite revenues of electric light and power companies only decreased .6 per cent, and the net income decreased 4.7 per cent.

Again, in the year 1949, gross national product dropped .3 per cent, and the FRB Index of Manufactures dropped 15 index points or 7.6 per cent from the level of the preceding year, but the composite revenues of electric light and power companies increased 5.8 per cent, and the net income increased 14.9 per cent. If we go back to the depression of the early Thirties, gross national product dropped 43.8 per cent from 1929 to 1932, and the FRB Index of Manufactures dropped 53 index points or 48.2 per cent, but the revenues of electric light and power companies as a whole dropped only 5.7 per cent, and the net income dropped only 13.5 per cent.

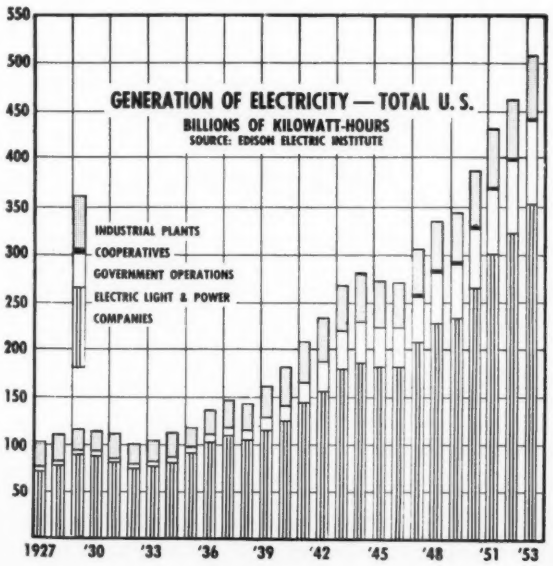

Figure 1

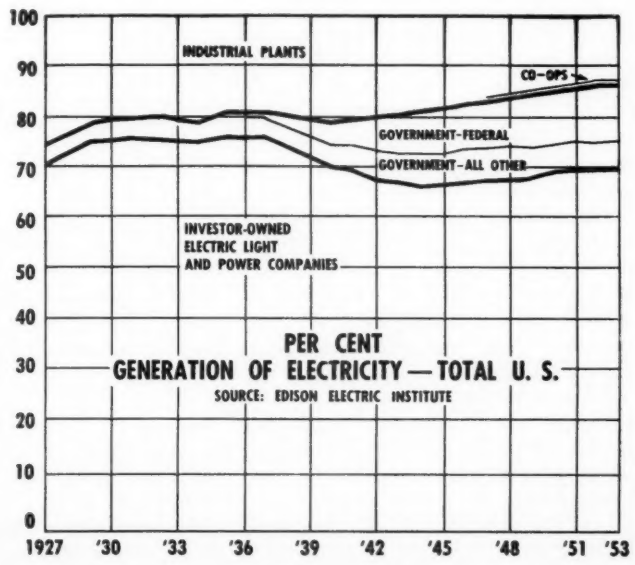

Figure 2

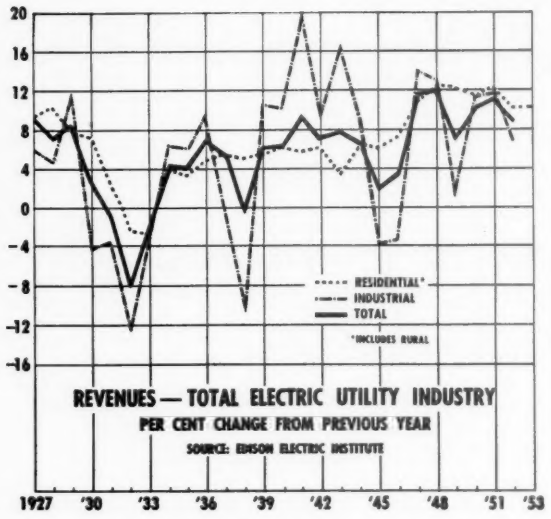

Figure 3

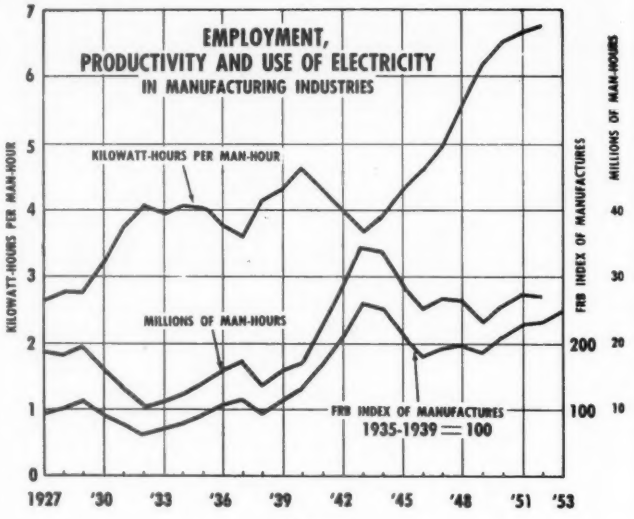
EMPLOYMENT,
PRODUCTIVITY AND USE OF ELECTRICITY
IN MANUFACTURING INDUSTRIES
KILOWATT-HOURS PER MAN-HOUR
MILLIONS OF MAN-HOURS
FRB INDEX OF MANUFACTURES
1935-1939 = 100
KILOWATT-HOURS PER MAN-HOUR
FRB INDEX OF MANUFACTURES
MILLIONS OF MAN-HOURS
0 1 2 3 4 5 6 7
100 200
10 20 30 40
1927 '30 '33 '36 '39 '42 '45 '48 '51 '53

Figure 4

Thus, with the anticipated readjustment in business in 1954 predicted by the leading economists mentioned heretofore, the revenues and net income of electric light and power companies as a whole, in my opinion, should not experience any decline.

Let us analyze some of the factors affecting the electric light and power industry.

Revenues

At the very outset I should like to call attention to Fig. 1, which shows the total kilowatthour generation of electricity in this country for the past 27 years by all agencies contributing to the public supply—investor-owned, government-owned, and cooperative—and by industrial plants that generate their own power requirements in whole or in part. I selected the year 1927 for the starting point as it appeared to be a normal year prior to the depression of the Thirties. This chart indicates that the investor-owned companies generate the preponderance of kilowatthours and that presently the remainder is almost equally divided between generation by government agencies and by industrial plants. Cooperatives were not separated as a class until 1947, and their generation is but a small part of the total.

The growth of the electric light and power companies' output during this period averaged 6.4 per cent per year compounded.

Fig. 2 gives the kilowatthour generation on a percentage basis and shows that, despite the rapid expansion of government power operations, electric light and power companies have maintained their percentage of total kilowatthours generated during this 27-year period. This has been accomplished by the continued shift of the power requirements of industrial plants from their own generation to purchased electric energy. In 1952, the latest year for which a figure is available, industrial plants purchased over 75 per cent of their requirements of electricity as compared with 65 per cent in 1929, and this trend should continue.

A breakdown of electric revenues by classes of service shows:

	Per Cent of Revenues	
	1927	1953 (Est.)
Residential*	32.4	42.1
Commercial	29.0	25.7
Industrial	30.4	27.8
All Other	8.2	4.4
Total	100.0	100.0

*Includes rural

This table indicates that the most stable source of revenue, namely residential, has been increasing over the years, and the outlook in this classification appears unlimited with the present and ever-growing new applications of electricity-consuming appliances.

Even during recession and depression, residential revenues continued to increase from year to year with but two exceptions as shown in Fig. 3, namely, in 1932 and 1933, but even in these years revenues received from residential customers were materially higher than in 1929. This stabilizing influence is readily apparent as total electric revenues do not decline in such periods as much as revenues from industrial sales.

As would be expected, during periods of decline in business the industrial sales in kilowatthours fall off. As will be noted in Fig. 4, total industrial man-hours drop off during depressed business conditions. However, I wish particularly to call attention to the fact that the kilowatthours consumed by manufacturing industries per man-hour increase during such times. This would seem to substantiate the feeling that the completely electrified manufacturing plants are the ones that continue to operate in times of business declines. Thus, our industry is fortunate in that industrial kilowatthours do not experience a decrease proportionate to the decline in manufacturing operations.

Decline of Residential Electricity Cost

As I have pointed out, the revenues of electric light and power companies have had a continuing long-term growth, and I can see no end to this growth or, shall I say, saturation for electric service. Certainly the price of electric service has been reasonable and has not followed the cost of living increases. On the contrary, as shown in Fig. 5, the price of residential electric service per kilowatthour has actually decreased from year to year.

True, the average annual bill for residential electric service has increased and will continue to increase with the expanding uses for electricity

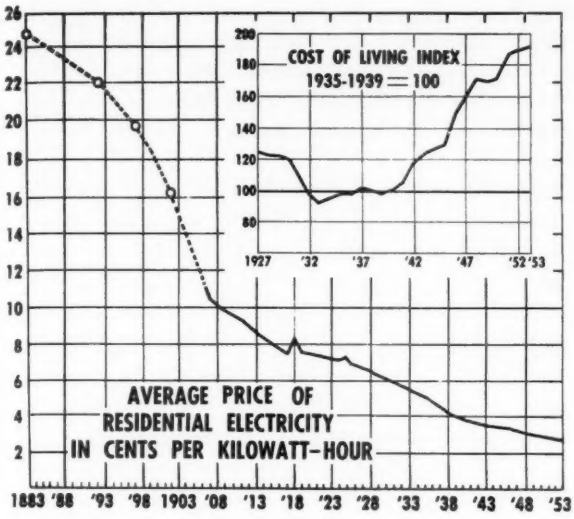

Figure 5

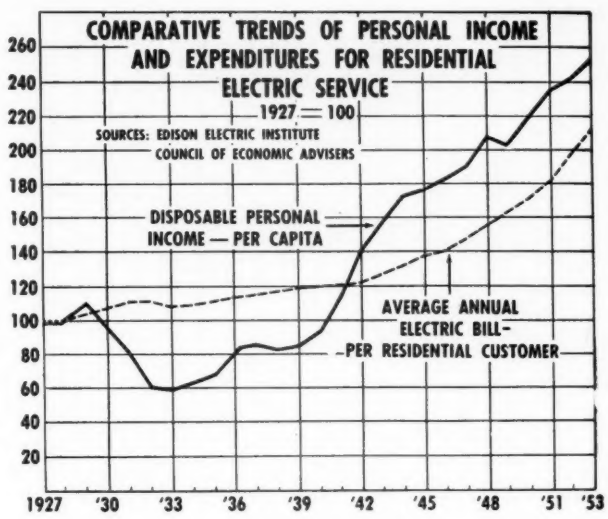

Figure 6

in the home and consequent increase in kilowatthours consumed per home. Fig. 6 shows the relation between the disposable personal income per capita and the average annual electric bill per residential customer. In 1927 the expenditure for residential electricity was .73 per cent of the disposable personal income, rising to a high of 1.48 per cent in 1933, then decreasing to a low of .8 per cent in 1944, and since that time gradually increasing to the present 1.15 per cent.

Fig. 7 shows that purchased power takes a continuing lower percentage of the total value of manufactured products—from 1.3 per cent in 1929 to about .6 per cent in 1953.

Certainly these two charts illustrate the great opportunities of these markets from a relative economic standpoint to absorb more and more of our service. In addition, the substantial increases in the cost of competitive fuels have broadened our markets.

Heat Rate and Load Factor

Over the years remarkable progress has been achieved in technological improvements in the art of the industry, one of which is shown in Fig. 8. The average heat rate for the industry, expressed in Btu per net kilowatthour generated, has been reduced from 22,599 in 1927 to 12,950 in 1953. There still remains considerable opportunity for further improvement as the heat rate of one of the large units scheduled for shipment this year is expected to be better than 8,900 Btu per kilowatthour, and manufacturers have on the drafting board units expected to have a heat rate of approximately 8,400 Btu per kilowatthour.

Load factor, which is a ratio based upon use (kilowatthours) and demand (kilowatts), has improved over the years as shown in Fig. 9. This means that the electric utility industry is operating its generating and other facilities at a higher percentage of its possible 24-hr output. Other factors being equal, the higher the load factor the less the cost of producing a kilowatthour. During World War II the load factor reached a peak of 64.2 per cent. For 1953 it was 62.1 per cent.

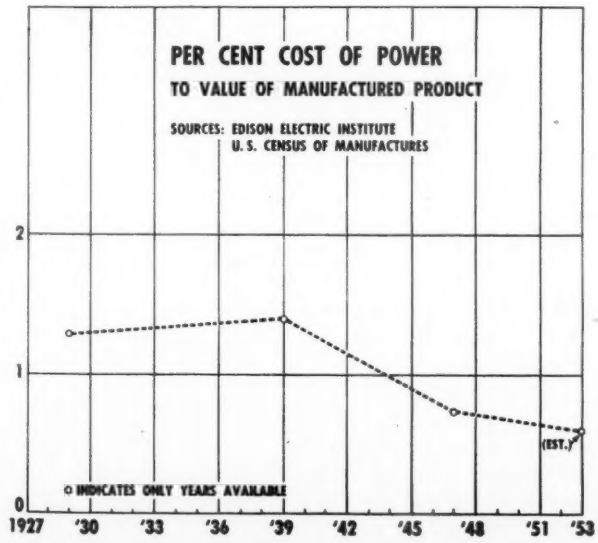
PER CENT COST OF POWER
TO VALUE OF MANUFACTURED PRODUCT
SOURCES: EDISON ELECTRIC INSTITUTE
U. S. CENSUS OF MANUFACTURES
o INDICATES ONLY YEARS AVAILABLE
(EST.)

Figure 7

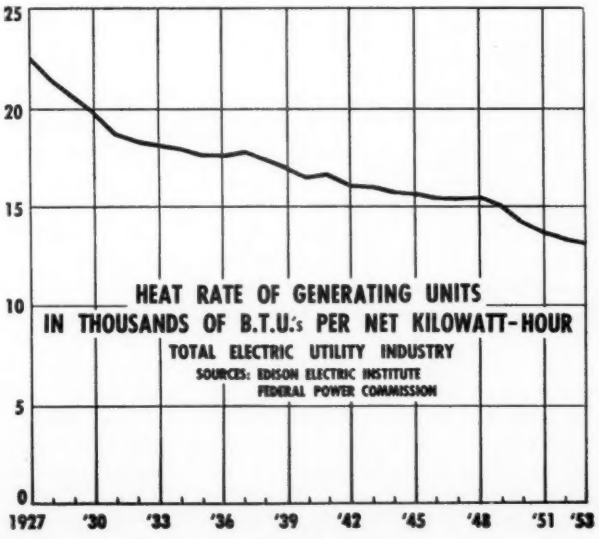
HEAT RATE OF GENERATING UNITS
IN THOUSANDS OF B.T.U.'s PER NET KILOWATT-HOUR
TOTAL ELECTRIC UTILITY INDUSTRY
SOURCES: EDISON ELECTRIC INSTITUTE
FEDERAL POWER COMMISSION

Figure 8

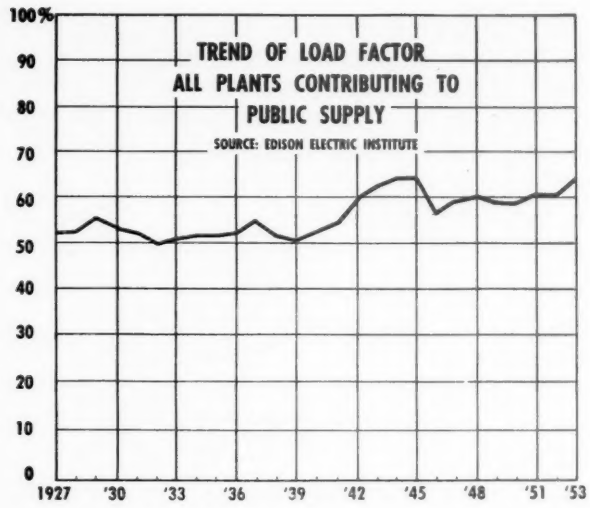

Figure 9

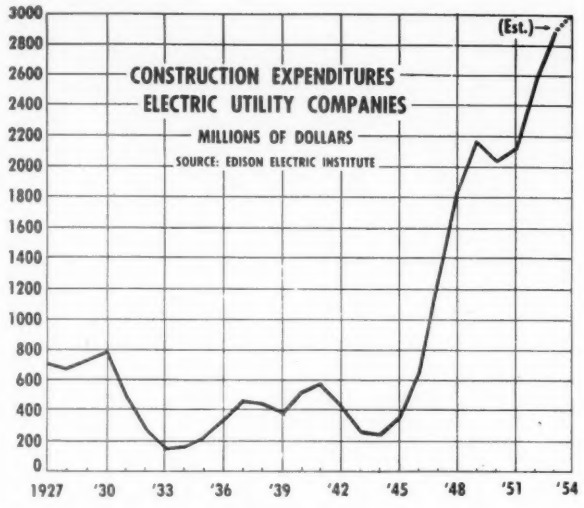

Figure 10

Taxes have taken an increasingly large share of the revenues, increasing from 9.4 cents per dollar of revenue in 1927 to 22.4 cents per dollar in 1953. During 1953 the electric light and power companies were subject to so-called excess profits taxes. The latter tax expired December 31, 1953, and it appears as though there may be some relief in the normal and surtax rates in the not too distant future. Any relief in taxes on income, of course, will be reflected in full in net income.

Rate Increases

Past growth, together with technological improvements, however, has not been able to offset the increase per kilowatthour in operating expenses and taxes, so that it has been necessary in the last few years to ask for rate increases. A total of 401 applications for rate increases were made by the electric companies from 1946 through 1953. At the year end, of this number, 362 applications were granted, 16 were pending action, 11 were withdrawn, and 12 were denied. The 1953 record alone shows 60 actions: 43 applications granted, 11 pending, and six withdrawn or denied. There has been one favorable action recorded so far in 1954.

The preceding record is tangible evidence that regulatory bodies are recognizing the inroads of inflation and have granted rate increases to insure the financial strength necessary for adequate electric service to the nation.

In the electric utility field regulatory lag is becoming less and less of a factor, for at the end of 1953, out of the above mentioned total of 401 rate applications, there were only 16 pending cases, of which 11 originated in 1953.

The situation is summarized by the following from the 1953 Report of the Committee on Rates of Public Utilities of the National Association of Railroad and Utilities Commissioners: "Significant changes in the past year in rate-making policy of the courts and regulatory commissions have largely been in the direction of taking greater cognizance of the effects of inflation and of adapting means to meet the situation. Changes have been made in regard to rate base determination, depreciation provisions, and rate of return."

Ratios and Construction Expenditures

Today the electric light and power companies as a whole are in a strong position financially. Let us look at what happened to the Class A and B electric utilities during the period of 1937 through 1952. I selected 1937 as figures are not available prior to that time. Further, 1953 figures are not yet available.

The dollar ratio of plant to operating revenues was 3.93 in 1952 as compared with 5.47 in 1937. The times fixed charges (after taxes) earned were 3.97 in 1952 as compared with 2.54 in 1937. The reserve for depreciation as a percentage of plant was 19.8 in 1952 as compared with 10.4 in 1937. The capitalization ratios at the end of 1952 were bonds, 48.7; preferred stock, 13; and common stock and surplus, 38.3. The per cent paid out of net earnings for common stock dividends in 1952 was 72.8, leaving a good cushion if adverse conditions should come about.

However, managements must be ever vigilant to maintain this strength so necessary to permit the companies to finance at reasonable costs of money the new construction needed to provide for the increasing requirements of existing and new customers.

Fig. 10 shows construction expenditures by years with an estimate of $3,000,000,000 for 1954—slightly greater than the 1953 expenditure. Total investment in electric light and power companies has increased from $12,500,000,000 in 1945 to about $25,500,000,000 today. According to the Survey of Current Business, U. S. Department of Commerce, expenditures for new plant and equipment for all industries in the country since the war have amounted to only slightly over $150,000,000,000, which indicates that the electric light and power companies' expansion accounts for one-twelfth of the total. For 1953, electric and gas utility companies as a group accounted for approximately $4,484,000,000, or 16 per cent, of the total of approximately $27,827,000,000 for all private industry.

Securities

Buyers of securities have a choice among the wide variety of industries in which to invest, and these industries are in competition with one another for the investor's dollar. In 1953 electric light and power companies did

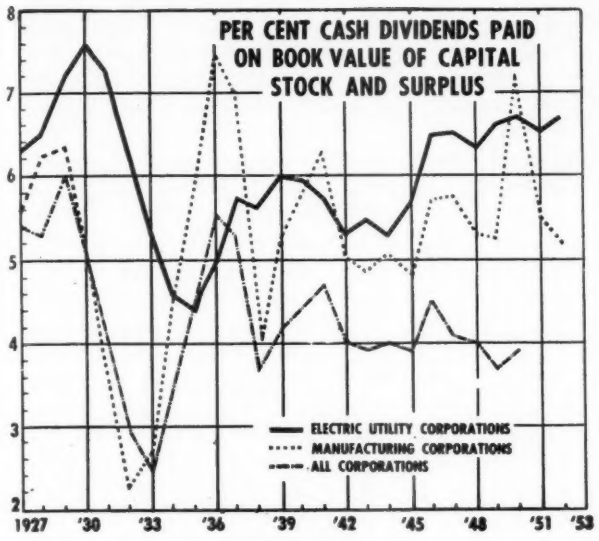

Figure 11

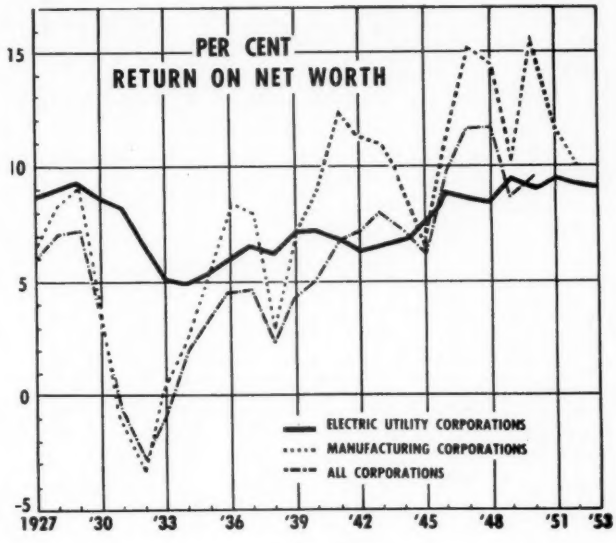

Figure 12

substantial financing; $537,000,000 of common stock, $223,000,000 of preferred stock, and $1,193,000,000 of long-term debt were issued, and arrangements were made for an additional $407,000,000 of long-term debt financing.

Now let's take a look at the relative position of the electric light and power companies with all corporations and with all manufacturing corporations. A comparison of per cent cash dividends paid on book value of capital stock and surplus, Fig. 11, shows that electric utility corporations as a group have been more stable than either of the other two groups, and the percentage dividend has, in general, been higher.

Further, Fig. 12 shows the rate of return on net worth—that is the stockholder's equity after the deduction of debts—for the electric utility corporations and the other two groups. Here again the stabiiity of electric utility corporations is clearly demonstrated.

In closing, the electric light and power companies have a good record, and I believe that the outlook for their securities is attractive.

Accident-Free Operation Nets 11 Companies Safety Merit Awards

TWO electric companies previously cited for 1,000,000 accident-free man-hours of operation have continued their safety records and are among the 11 companies which were presented 13 Safety Merit Award Certificates during the period between January 1 and February 15.

Latest awards to these two companies recognize 2,051,240 accident-free man-hours achieved by the Electric Department of the Northern Division of Delaware Power & Light Co. and 2,000,733 man-hours by Kansas Gas and Electric Co. A third company, Monongahela Power Co., received certificates for three of its divisions—Fairmont, Parkersburg, and Southern—that worked a total of 3,110,740 man-hours of safe operation.

Awards made during the period to the 11 companies were for a total of 16,054,188 man-hours, bringing to 331,511,177 the number of accident-free man-hours recognized since the award's inception in 1942.

The Safety Merit Award Committee wishes to point out to companies which have a total of less than 100 employees that they may qualify for a certificate for 500,000 or more man-hours. The committee emphasizes that this certificate applies only to companies where the entire payroll is for 100 persons or less, and not for smaller divisions or plant groups of large companies.

Recent Recipients

Issued during the January 1—February 15 period were the following awards:

Alabama Power Co.	
Electric Division	1,255,382
Consolidated Gas Electric Light and Power Co. of Baltimore	
Electric Division	1,193,590
Dallas Power & Light Co.	
Entire Company	1,176,794
Delaware Power & Light Co.	
Electric Department—Northern Division	2,051,240
The Detroit Edison Co.	
Production Department—Trenton Channel Plant	1,000,970
Kansas Gas and Electric Co.	
Entire Company	2,000,733
The Lowell Electric Light Corp.	
Entire Company	1,082,530
Monongahela Power Co.	
Fairmont Division	1,004,608
Parkersburg Division	1,062,572
Southern Division	1,043,560
New England Power Co.	
Northeastern Division	1,136,634
Oklahoma Gas and Electric Co.	
Horseshoe Lake Generating Station	1,000,000
Southwestern Gas and Electric Co.	
Entire Company	1,045,575

Industry and Electric Company Cooperation for Progress

George E. Whitwell
Vice President in Charge of Sales, Philadelphia Electric Company

Extracts from an address before the National Industrial Electric Heating Conference sponsored by the Industrial Electrification Council, Cincinnati, Ohio, January 18, 1954

THIS year the electrical industry is celebrating Light's Diamond Jubilee—the 75th anniversary of Edison's invention of the incandescent lamp. Important as was that event, there is a greater significance attached to it that the industry cannot afford, in its enthusiasm for Edison's invention, to overlook.

Even before the genius of Edison produced the incandescent lamp, Brush, Thompson, and Huston had developed the dynamo to the point that it was ready to be put to work, either as a generator to produce electrical energy or as a motor to convert electricity into mechanical power. Edison's invention was combined with others that were equally significant to bring to reality the vision of central stations producing and distributing electrical energy for general use.

Greater Significance of Jubilee

Thus were born not only our own electrical industry but also the productive might of this country. They are responsible for our present high standards of living and for the unchallenged place our country occupies in the world. These things provide the greater significance which attaches to this Diamond Jubilee!

Immediately following the dedication of the first central stations erected to supply electricity for lighting systems, other men foresaw electricity's possibilities as a source of energy for power, heat, and a host of other applications. They backed their vision with courage and initiative. Through these attributes, displayed also by American industry in accepting these new ideas, have come our country's productive capacity, its standards of living, and its security in an uneasy world.

From these beginnings have sprung the many domestic appliances that make our homes the most comfortable in the world and that take the drudgery out of the housewife's life. From them have sprung radio, television, movies, and many other devices for our entertainment. Automobiles, railroads, airplanes, and great ocean liners, which constitute our modern transportation systems, would not be available and could not be operated without electricity.

Think of how many of the necessities and luxuries of modern life would not be available, either in sufficient quantity or at a low enough price for practically universal use, had it not been for the aggressive spirit, the broad vision, and the magnificent accomplishments of the pioneers of our industry. Our treasured heritage is the opportunity to continue to develop the fields of usefulness of electricity and of electrical apparatus and equipment and to sell those uses to American industry.

Our victories in two World Wars, which enabled us to preserve our freedoms, were made possible by these same factors. Faced with the necessity of developing better weapons and munitions than those possessed by our enemies, and of producing them in greater quantities, American industry's inventive ability, the speed with which it converted its facilities or built new ones, and the vast quantities it produced literally buried our enemies under an avalanche of production. An example of its daring and resourcefulness can be found in the atomic bomb, where facilities were in an advanced stage of construction before laboratories and pilot plants had completed their research or had developed the final methods of production.

All this has been accomplished by men's ability to envision new products and ways of making them; by their ingenuity in developing ways of producing them faster, better and cheaper; by their courage in risking their capital in developing them and in the facilities to produce them; and, finally, by the aggressive spirit with which they have sold them. Everyone in the electrical industry can take justifiable pride in the fact that he has been a part of these achievements. The history of the next 75 years will be largely determined by the degree to which we now use and develop the characteristics that contributed so much to the history of the past 75 years.

No application of electricity offers greater promise than industrial electric heat. While it was a slow starter, it has been growing in importance by leaps and bounds, despite misconceptions under which it has been laboring. New methods for its application and use have been developed rapidly under the pressure of war demands, and experience has already done much to dispel the misunderstandings.

Herein lie the opportunity and the challenge of the next 75 years to those connected with industrial electric heat. They must continue to develop its possibilities, to overcome the misconceptions regarding it, and, in so doing, to contribute to our continued defense against aggression and to our continued advance into better and better living.

Present and Potential Uses

Let's make a quick rundown of some of its present and potential fields of usefulness in both the realms of better living and productivity.

The kitchen of your home is probably as good a place to start as any. The beautiful finish on your major appliances, which strikes your eye as you walk in the door, may be a porcelain which was fired in an electric furnace at high temperature or an enamel baked on in an electric oven—possibly an infrared tunnel. Some of the metals used in them may have been produced in an electric

furnace, particularly if they contain stainless steel. Quite probably some of the sub-assemblies, such as your refrigerator condenser, were brazed in an induction heater.

And what about the appliances themselves? Of course, your electric range depends on electric heat. Your clothes washer and dish washer may depend on an electric heater for their supply of hot water and may have heating elements incorporated in them to help dry the clothes or dishes. Your electric refrigerator may present the paradox of having two built-in electric heating elements —one to defrost it quickly and easily and one to maintain your butter at a higher temperature than the refrigerator so it will spread easily when you want to use it.

Electricity Consumption

The average home consumes nearly five times as much electricity today as it did 25 years ago. This consumption would be impossible had not electric heat helped to produce the appliances now in common use faster, better, and cheaper, and to make them easier to operate and to give better performance after they are installed.

And so on through a home or a business establishment. Many of the nonelectric appliances, the furniture or the building itself, may have had electric heat used in their production. Heat treating for metal articles, electric drying for painted articles, and dielectric heating to dry and set the glue in the veneers and plywoods used in making furniture are but three of the multitude of applications which may have helped to make living what it is. Plastics, stainless steel, and other new materials are becoming more and more popular in construction and furnishing, and many of them are dependent upon electric heat.

In industry, advances have been even more spectacular and far-reaching.

Steel is generally considered to be the basis of our economy and, in this industry, electric heat is only beginning to envision its field of usefulness. The electric arc furnace made a modest entry into the steel making field in 1910, but, by 1951, nearly 7 per cent of the total steel produced in the United States came from electric furnaces. Generally, this production has been in the category of high-alloy steels, in which electricity is unchallenged, and the steadily increasing trend to alloys augurs well for its future. Jet engines for airplanes and guided missiles are requiring new and more exact alloys which can be produced best, if not solely, in electric furnaces.

Titanium, a newcomer, is typical of developments in the metallurgical field. It is playing an important part in the development of jet engines with its lightness, resistance to corrosion, and good tensile strength at temperatures up to 800 F. Electric melting performs a specific function in the production of titanium ingots for forging or rolling. While at the present time less than 1 per cent of titanium ore is used to produce metallic titanium, one can anticipate a tremendous increase in this production as new uses are found for it. Every new metal, every new alloy, requires more exacting production methods and opens new avenues for the application of electric heat.

Potential Use in Steel Industry

While the principal field for electric furnaces in the steel industry has been in the production of alloys, there is a new and quickened interest in the potentialities of electric furnaces as replacements for open hearths in the production of plain carbon steels. Recent surveys have shown that there are about 950 open hearth furnaces currently in operation in this country. About 100 have a rated capacity of over 200 tons per heat, while some of the newer open hearths are rated at 275 tons.

A recent study, jointly sponsored by 14 electric companies and Bituminous Coal Research, Inc., was conducted by Battelle Memorial Institute to appraise the present and potential competitive aspects of the electric furnace and the open hearth process for producing plain carbon steels. Cost information obtained through the cooperation of steel plants, furnace manufacturers, construction firms, and utilities indicates that modern electric furnaces involve a capital cost which is about 60 per cent of that of a comparable size open hearth furnace. Contributing to this condition is the fact that the area required for an electric furnace, including shop space for charging, melting, and pouring, may be only 60 to 70 per cent of that required for an open hearth. Over-all operating costs of electric steel melting closely approach those of the open hearth and in some instances are lower.

Another important economy factor is the ability to shut down the electric furnace over weekends, whereas the open hearth must be kept under heat to preserve the furnace and its lining. Other less tangible factors include flexibility, availability, and ease of operating and quality control. All of them tend to tip the balance still more in favor of electric melting practice. These items, coupled with the fact that an electric furnace lends itself particularly to the growing production of alloy steels, point toward more and larger electric melting installations.

Advantages Outweigh Cost Factor

I cite these advantages of electric heat in the steel industry because they are typical. There is hardly any industry that does not have some heat applications where an intelligent appraisal of the problem will not disclose that any adverse differential in fuel cost alone is more than overcome by other advantages.

In the automobile industry, as another example, we find electric heating equipment being used in many ways. In addition to use with electrically melted alloy steel components, it is widely used to heat treat tools, dies, gears, crank shaft bearings, pistons, and many other items, as well as washers and setscrews. This industry makes use of large arc melting furnaces, batch- and continuous-type heat-treating furnaces, induction heaters for selective heat treatment or brazing, and radiant or infrared equipment for drying and finishing body parts. The size of this industry is indicated by automobile production, which was expected to reach 6,200,000 in 1953.

In the manufacture of television and radar equipment, many operations would be difficult, even impossible to accomplish, without the use of new and ingenious electric heating applications. Electronic devices used in exhausting tubes and ovens to bake the sensitive coatings on the tubes are among the many important electric heating applications

used by manufacturers of tubes for television sets. Production of TV sets was expected to reach 7,000,000 last year. During the same period, over 200 new television broadcasting stations were placed in operation.

As we consider the host of other manufactured items which are becoming more and more necessary to our modern way of life, we find a multitude of developments in the fast growing field of chemicals. Such trade-named synthetic materials as Nylon, Orlon, Dacron, and Acrilon, or the many phosphorous compounds used as detergents and as ingredients in many pharmaceuticals, are typical of the rate at which the industry is growing.

Plastics and many other synthetic products require certain refinements in manufacturing in order to obtain uniformly high quality product at an economical cost. Many plastic materials may be extruded from electrically heated dies or molded in electrically heated presses. Synthetic textiles may be processed with electrically heated dowtherm or by the use of dielectric heating at some stage of their manufacture. Phosphorous compounds in general are made from pure phosphorous—an electric furnace product. The chemical industry, which is now a multi-billion dollar a year business, is reported to be expanding three times as fast as the rest of industry so that its future power requirements will be very extensive.

Small Metal Sheath Heaters

In many instances, small metal sheath heaters can open up new opportunities for extending the market for the use of electricity in our territories. Ranging from the size of a pinhead to 15-ft lengths and available in sizes and types that permit bending and forming in a variety of shapes, they find application in heating aerial camera lenses; in the manufacture of garden hose, molded rubber items, and mirrors; in embossing leather; in applying rubber soles to shoes; in cleaning metal parts; in plating solutions; in the preparation of vaccines; even in ripening bananas.

Among the numerous new production methods is a process whereby steel assemblies, such as engine exhaust manifolds, valve bodies, and heat exchangers, are coated with aluminum in an electric salt bath furnace. Assemblies coated in this manner are corrosion and heat resistant, and the process opens an entirely new field of electric heat application.

Many of these developments are in their infancy. Jet propulsion is by no means a finished product, guided missiles are still in the experimental stage, and space ships are, so far as we know, still on the planning boards —but they are on them. Development of all these projects is being pushed with an urgency born of the world's disquiet and our need to make ourselves impregnable.

Equally imposing, if not so urgent, is the array of developments in the nonmilitary field which are now in the laboratory, the design stage, or the imagination of manufacturers. Every step in progress in either field will develop needs for new materials, new equipment, and new ways of producing them, and is a challenge to American industry and to electric heat engineers, requiring them to exercise their vision and ingenuity in meeting the demands.

The imagination is fired by these challenges for the future, but no less important, no less challenging, are the problems of today. There are right now literally thousands of places in industry where electric heat can improve quality, increase production, and reduce costs if it is applied. Every time we enter the doors of a factory there is a new challenge to ferret out these applications and do something about them and to break down the barriers which are retarding the expansion of this useful industrial tool—barriers of tradition, barriers of prejudice, barriers of misconception.

Competitive Elements

Too often held by industry is the misconception that electricity is a too expensive fuel. Perhaps it is when its cost alone is considered, but the prospective customer isn't buying a fuel. He's producing a product in a competitive market and over-all results are what count—not just one item of cost. So there's another challenge, another barrier to be overcome.

Speaking of competitive elements, there are many who feel that we are entering another phase of the business cycle where competition is going to be keener than it has been since the Thirties. If such is the case, factories with antiquated or obsolete methods will find tough sledding and their very existence may be in jeopardy. This possibility poses still another challenge. It is that we can be of greater service by offering our customers help in modernizing their methods and equipment so that they, in turn, can better meet the challenge of survival.

Unprecedented Opportunities Ahead

If only half of the picture I have painted can be expected to materialize, we are facing an era of unprecedented opportunities — opportunities for today, opportunities for tomorrow, and opportunities for the most distant future. We would have a real research problem if we tried to trace through every place where industry can benefit from electric heat. A more practical and worth-while approach would be to determine every place electric heat can be used now to improve a product or reduce its cost in the factories of our own customers.

There are already enough people working on this project to give us every reason to anticipate an even greater rate of progress in the future. Realization of the full possibilities of electric heat in industry, however, depends upon the extent to which we undertake to provide leadership.

The Industrial Electrification Council offers a path to the more rapid attainment of these goals. I do not think I need to extol the value of cooperation and coordination of effort with our natural allies, manufacturers, distributors, dealers, contractors, and engineers. But I may be permitted to moralize to the extent of pointing out that neither cooperation nor coordination are one-way streets. To be effective, they must be mutual. We must conscientiously and continuously struggle to develop them, and our allies must reciprocate. It is the aim of the council to provide a means for developing these ends. Its usefulness will be in direct proportion to the extent to which we help develop it, make use of it, and make it work.

Employee Opinion Surveys

George P. Massengale
Union Electric Company of Missouri

A paper sponsored by the EEI-AGA Accounting Employee Relations Committees

WITH the increasing emphasis that has been placed by industry in recent years on employee relations, it is perhaps not surprising to find that more and more interest is being shown in the closely related subject of employee opinion. In fact, it would seem to be a most logical procedure for a company that is concerned about its employee relations to seek factual information about those relations by means of a survey of employee opinion. Such a course is thought of as a scientific approach to the problem.

However, there is far more involved in an employee survey than the apparently simple task of gathering and tabulating data. A management which is considering using the survey method to "get the facts" should pause and consider the implications of its action before embarking too casually on such a project.

Alternative Methods

There are other ways, of course, to determine employee opinion than the use of a standardized opinion survey. At one time or another industry has made use of suggestion systems, essay contests, personal interviews, conference discussions, and various other methods. These methods all have their value; but within recent years the formal opinion survey has been increasingly favored, no doubt because its results appear to be more factual and because they lend themselves more readily to statistical treatment. By factual is meant that the survey, when conducted under proper safeguards, should produce results that closely correspond to how employees actually feel. It does not mean that the tabulated answers are facts. They are opinions, which may or may not represent the facts in any given case.

An employee opinion survey, as the term is here used, means a formalized, written, anonymous expression of feeling in which the employee answers questions or indicates agreement or disagreement with printed statements relating to his job, his pay, the boss, company policies, etc. By this means, standardized answers are provided for statistical and comparative purposes. This type of survey usually provides also for the employee to add any comments of his own, favorable or unfavorable, that he may care to make. The survey thus combines the advantages of standardized treatment with the insights which come from more spontaneous expression. The "free comments" cannot be readily tabulated, but they are of great value in helping to interpret the standardized answers.

Experience With Surveys

Experience with opinion surveys during the last few years has proved that a good survey properly conducted can be a valuable tool in the promotion of a sound employee relations program. Experience has also shown, however, that the conduct of an opinion survey is not at all the simple operation which it might at first appear to be. A company without knowledge in this field may well consider the use of outside consultants. The cost of obtaining their advice may turn out to be the least expensive part of the survey.

Not much can be said about employee opinion surveys as related specifically to public utilities. A number of such surveys has been conducted during recent years by utility companies; but, as far as is known, no attempt has been made to bring together the results of these surveys. A study of this kind, if it could be made and if it could lead to the establishment of utility company norms, would be valuable and highly interesting. One of the first questions which invariably crops up after a survey has been conducted and the results are made known is "how do we compare with other companies?" There is a type of survey form now available to utility companies which provides an industrial norm for comparative purposes; but, for the present at least, no utility norm is available.

Comparisons with other companies, however, while interesting, are not essential to the success of a survey. Comparisons within the company itself will prove to be valuable, e. g., supervisors vs. employees, white collar vs. blue collar, department A vs. department B, and, of course, a re-survey taken after the lapse of a year or two vs. the original survey.

But what is a successful survey? And what are the factors which determine its success?

One definition of a successful survey (no doubt there are many others) is that it is one which meets two basic requirements: it must produce factual information of a kind that can be readily used in the furtherance of good employee relations; and it must attain this result in a positive manner, i.e., the conduct of the survey itself should improve and not damage employee relations.

Determinants of Success

As to the factors which determine success, the following would appear to be musts:

1. Employee cooperation must be secured in advance. If there is a union, the cooperation of union officers is essential.
2. The survey must be anonymous and must be conducted in such manner that the employees are convinced that it is anonymous.
3. The answers must be coded so that they can be tabulated by meaningful groupings. These groupings must not be too large or too small.
4. Survey results must be reported back to employees and to the union.
5. The results must be properly interpreted.
6. The results must be acted upon.

The first three factors have to do with necessary advance preparation. The details involved in this preparation are far too numerous to be elaborated here. They can be summarized in the statement, "If the survey is to be successful, it must be carefully planned and painstakingly executed under expert direction." Expert direction usually involves close cooperation between the management of a com-

pany and experienced outside consultants.

The last three factors refer to necessary action after the survey has been completed. Again, the procedural details are too numerous to be listed here and expert direction is desirable. And whereas advance preparation may require weeks of planning, post-operative procedure may easily involve months or even years of work, for an employee survey, unless conducted with the intention of taking corrective action wherever such action is indicated, had best be left undone.

A Commitment to Action

Implicit in the survey is an inevitable commitment to action. If it is used merely to satisfy management's curiosity, if it is simply read and then filed away, the survey is most certainly worse than none at all. Such a course will lead to intensification of many of the very difficulties which the survey seeks to uncover. From the very outset then, the project had best be considered in this light. It is, in effect, management standing up before its employees and saying:

1. The management of this company is really interested in and concerned about your ideas and opinions of the company.
2. We are prepared to face up to the fact that your opinions may be less favorable than we think they are, or hope they will be.
3. If this survey uncovers situations that require improvement, we expect to take constructive action wherever such action is feasible.

Of course, in no case should management give the impression that it intends to correct or change everything that employees may complain about. Any such implication is unfair both to employees and to management, in addition to being unrealistic. However, unless management is prepared to find itself on the receiving end of a chorus of complaints and deeply implicated therein, it had best not undertake the survey.

Variety of Complaints

The extent and variety of things which employees can find to complain about may turn out to be rather startling—with complaints about pay, working conditions, supervision, management, company policies, fringe benefits, promotion opportunities, safety, tools, job specifications, inequities, communication, almost ad infinitum. In a recent survey, one employee pretty well summarized the complaints when he wrote, "In fact, the whole situation is lousy."

No doubt there will always be people from whom some such response can be expected. No doubt, too, that within any company there are areas from which a generally unfavorable reaction may be looked for. But what may hurt a little bit is to receive complaints from a location where much thought and money has already been expended in an effort to make the situation approach the ideal. For example, what is to be made of a chorus of complaints about working conditions from employees located in a model office building with excellent lighting, ventilation, etc.?

Are such complaints unlikely? No, they can and do appear. After all, the survey is designed to uncover employees' hidden resentments and animosities. And if a person's morale is low for any reason, he may be inclined to "take it out" on whatever is nearest at hand. The unfavorable reaction may thus be symptomatic of something deeper. And those in management who lack a taste for depth psychology will be tempted to dismiss the whole matter as too obscure for common sense analysis or action.

Rules of Procedure

Nevertheless, some action is required in those areas where the difficulty can be determined and the remedy is feasible. In this connection, following are a few rules of procedure which experience has shown to be valuable:

First, management must consciously avoid assuming a defensive position, and it must take steps to see that its supervisors likewise do not have a defensive attitude. The problem requires analysis and interpretation, not rationalization.

Second, over-all results must be promptly and candidly reported to employees. But discretion must be exercised in reporting individual group results, to avoid embarrassment to supervisors and employees in "low" groups.

Third, results must be carefully studied and properly interpreted. It is obvious that many complaints cannot be taken at face value. Often they are symptomatic, and, unless this is recognized, any action taken may merely result in a shift in the focus of subsequent complaints rather than any stable improvement in morale.

Fourth, not all the complaints require corrective changes. In some cases, all that may be indicated is to clear up misconceptions and ignorance. (This is not always an easy procedure, of course.) On other occasions it may be necessary to state frankly that a request is impracticable and will not be granted, at the same time giving the reason.

Finally, corrective action, where such action is indicated, should be both prompt and deliberate. Prompt action is highly desirable in areas where the remedy is obvious and practicable. Unfortunately, the majority of problems do not fall here and can be solved, if at all, only by long-range planning and persistent effort.

Specific Actions Undertaken

The next point relates to specific action undertaken by management as a direct result of survey findings. Following are a few examples of successful action, taken from the announced results of several companies:

1. In one case, a feature of the company's retirement program was found to be greatly disliked by employees. It was found possible to change this feature at some added cost, and the change was made.
2. In another case, a very unfavorable attitude toward the retirement program was changed to a favorable attitude by means of a well planned and executed educational program.
3. A company that found its supervisory forces greatly disturbed by what they considered to be lack of recognition adopted various measures to enhance supervisors' status. The result was a noticeable improvement in supervisory morale.
4. A company discovered that its upward communication was unsatisfactory and adopted a suggestion plan to improve it.
5. Undoubtedly the greatest single field for improved employee relations lies within individual departments. This follows from the fact that employees tend to be

(*Continued on page* 95)

What They Were Saying in 1879, 1904 and 1929

Background for the 22nd Annual EEI Convention

THE year 1954 marks at least three milestones in industry progress. Last January 28, the industry celebrated attainment of its fifty millionth customer. Sometime this fall industry generating capacity will reach 100,000,000 kw. Next October 21, the 75th anniversary of Edison's invention of the first practical incandescent lamp, the industry's year-long observance of Light's Diamond Jubilee will come to a climax.

Falling among these dates, the 22nd Annual EEI Convention, to be held in Atlantic City, June 1-3, will be a fitting occasion to assess the industry's vast potential for future expansion, as well as the tremendous impact electrical progress has already made on American life and economy.

Planning for the last quarter of the industry's first 100 years will be emphasized at the convention. The future, however, is built upon the past. Thus, by describing the industry at salient points in its development, the following may highlight the background of the coming meeting and the great work ahead.

1879
Public Impatience

The "Unbelievable Miracle" of Electric Light

WHEN the accomplishments of the present-day electric industry are considered, it is difficult to realize that the background for the 1954 convention has been created in the space of a single lifetime. Yet, it was only 75 years ago that the public was awaiting news of Edison's development of the incandescent lamp.

"Nothing can better illustrate the rapidity and intensity of life in the latter half of the nineteenth century than the impatience with which the American press and public have awaited the result of Mr. Edison's experiments with the electric light. The daughter of the horse-leech would contemplate with surprise the importunity with which it is demanded of an inventor that within a few months he shall turn the current of a subtle force into commercial channels, constructing and giving to the public a new illuminator requiring profound experiment and the most complicated mechanism. 'What they have done,' says Emerson of men of action, 'commits and enforces them to do the same again;' and to this great public demand Mr. Edison's high standard of achievement has made him forever amenable." — *Scribner's* magazine, June, 1879.

It was only four months later at the Menlo Park laboratory that Edison and his associates ended a 40-hour vigil that witnessed the birth of the electric industry. For two nights and a day they had watched a filament glowing in a glass bulb, and at the end of their vigil the filament was still burning brightly. It was then that Edison knew he had finally produced the first successful electric lamp.

A Great News Scoop

To announce the results of his experiments, Edison called in his long-time newspaper friend Marshall Fox, who spent several days at Menlo Park making notes and sketches. Fox's article scored one of the greatest newspaper scoops of all times:

"The near approach of the first public exhibition of Edison's long looked for electric light, announced to take place on New Year's Eve at Menlo Park, on which occasion that place will be illuminated with the new light, has revived public interest in the great inventor's work, and throughout the civilized world scientists and people generally are anxiously awaiting the result. From the beginning of his experiments in electric lighting to the present time Mr. Edison has kept his laboratory guarded closely, and no authoritative account . . . of any of the important steps of his progress have been made public—a course of procedure the inventor found absolutely necessary for his own protection. The *Herald* is now, however, enabled to present to its readers a full and accurate account of his work from its inception to its completion."

After describing the structure of the lamp, the article pointed out that the "apparatus is ready to give out a light that produces no deleterious gases, no smoke, no offensive odors—a light without flame, without danger, requiring no matches to ignite, giving out but little heat, vitiating no air, and free from all flickering; a light that is a little globe of sunshine, a veritable Aladdin's lamp. And this light, the inventor claims, can be produced cheaper than that from the cheapest oil. Were it not for the phonograph, the quadruplex telegraph, the telephone and the various other remarkable productions of the great inventor, the world might well hesitate to accept his assurance that such a beneficent result had been obtained, but, as it is, his past achievements in science are sufficient guarantee that his claims are not without

foundation, even though for months past the press of Europe and America has teemed with dissertations and expositions from learned scientists ridiculing Edison and showing that it was impossible for him to achieve that which he has undertaken."—*New York Herald*, December 21, 1879.

A note appended to the article stated that "This miracle of Thomas Edison's was so unbelievable that the managing editor of the *Herald* nearly fired the reporter who wrote this story."

Stimulates Great Interest

Over 3000 people visited Menlo Park on New Year's Eve to see Edison's office and laboratory illuminated by electric light, as well as some of the streets and houses in town. The demonstration and contemporary news reports stimulated great interest in electric lighting. People wanted it, and they continued to want it in increasing numbers during the next 25 years.

1904

Central Stations Advance

"Electrical Industries Still Lead Van of Human Progress"

The rapid development of the central station industry after Edison's invention of the lamp was emphasized at a convention of the National Electric Light Association in Boston in 1904, the 25th anniversary of incandescent lighting:

"The central station industry of the U. S. has enjoyed . . . another year of marked advance and prosperity. Although the period has been one of uncertainty and disturbance in the financial markets, the disasters of speculation thus thwarting the legitimate hopes and ambitions of industrial enterprise and checking new investment, electric lighting has experienced no setback. The rate of gain over previous periods has apparently been maintained, if indeed it has not been accelerated.

"Growth and Status of the Art"

"Statistical data are the first that should receive consideration, and fortunately we now have a firm basis upon which we can found our study and analysis of the figures of electric light and power. When I had the honor to present my report last year . . . the U. S. Census statistics were not available as to the growth and status of the art. They have since been published, and are perhaps now familiar. . . .

"It is to be borne in mind that the figures quoted are for 1902, but they are the latest available. . . . These being the first compiled, it is difficult to establish a percentage of annual gain, but it is safe to say that the rate of increase each year is not less than 10 per cent. A great many companies do better than that. At the time of the enumeration there were 3620 central electric stations in operation. The cost of their construction and equipment amounted to $504,740,352. The gross income for the year was reported at $85,700,605, and the total expenses at $68,081,375. These stations furnished employment to 23,330 wage-earners, who received $14,983,112 as wages during the year. The power-plant equipment consisted of 5930 steam engines with 1,379,941 indicated horsepower, and 1390 water wheels with a stated horsepower of 438,472. The generating plants consisted of 12,484 dynamos of every description with a stated horsepower of 1,624,980. A noteworthy feature in the development of this industry has been the installation of plants operated under the control of municipalities. There were 815 of these plants in operation. . . .

"The above figures, however, do not tell the full central-station story, as during the same year there were 252 electric railways doing a central-station business; nor, of course, are any data presented from the 50,000 isolated plants—more or less—that exist all over the country. The current output for the year was estimated and returned at 2,507,051,115 kwhr, or about 25 per cent of the possible work that the stations could do in 24 hours of daily operation. . . .

"It is interesting to note that all the street railways of the country had just about 1,750,000 hp. The output for the street railways was returned at 2,261,484,397 kwhr for the year, or 6,249,910 per day; so that while the output of the lighting plants was 250,000 kw larger daily, the plants ran fewer hours. . . . The dynamo capacity of the street railways was 1,204,238 hp, while the dynamo capacity of the lighting plants was 1,615,480 hp. Reducing this to kilowatts, it would appear that the capacity of the railways was in full use nearly eight hours daily, while the capacity of the lighting plants was in use about six hours daily. . . .

Electrical Development in England

"(Regarding electrical development abroad), perhaps England should receive our first attention, and the figures there are presented in the recent inaugural address of President R. K. Gray, of the British Institution of Electrical Engineers. He pointed out that two-thirds of all the electric lighting in the United Kingdom is in municipal plants and only one-third in the plants of private companies. . . . In the United States only about 5 per cent of the lighting is municipal. The average rated capacity of a British station is about 1400 kw, while that of the United States is only 340 kw. The total rated station capacity in Great Britain is, however, given only as 480,000 kw, while in the United States the total in June 1902, was 1,200,000 kw for less than 4000 plants as compared with less than 400 British. Consequently, while the average British station is four times as large as a United States station, the United States lighting is nearly three times as large as the British. . . .*

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* Kilowatthour production by electric industry in 1953: United Kingdom, 65,500,000,000; United States, 442,000,000,000.

"W. F. White, a well-known central-station manager, in a recent comment said that 'the field for the sale of electrical energy is comparatively unexploited. Its sale for general power purposes has only begun. In not a single large city of the United States have the possibilities of the industrial power business been fully developed, much less exhausted. In many of our best cities today the gross receipts from the sale of electrical energy for all purposes do not exceed $1.00 or $1.50 or $2.00 per capita per annum. . . .'

Twenty-Five Years of Light

"It is only fitting that this report should mention the commemoration this year of the 25th anniversary of incandescent lighting in America, and the foundation of the Edison medal, to celebrate the event, in the American Institute of Electrical Engineers. This medal is to be awarded annually to the student producing the best thesis or record of original search, in our colleges, and a fund of over $7000 was readily raised from among Mr. Edison's associates, friends, and admirers. The banquet in New York last February to celebrate the occasion was one of the most notable electrical events of its kind. In speaking of the growth of the industry, Mr. Edison said recently that the production in this country of incandescent lamps had reached a total of about 250,000,000 or 10,000,000 annually since 1879. The present American consumption, it may be added, is about 45,000,000 and the productive capacity of existing factories is about 65,000,000. . . .

Advantage of Electric Heat

"According to the U. S. Census Office figures, the electric-lighting industry has already caught up with that of artificial gas, and there is no sign of any slackening of pace so far as electricity is concerned. . . .

"One incident reported to me . . . of the advantage of electric heat over other methods was conspicuously developed at Harvard Memorial Hall . . . by the introduction of electric waffle irons, displacing gas irons. Electric waffle irons, being heated on both sides at once, produce a more perfect product and do the work more quickly than with gas. . . .

"It was found that for serving the students, where there was demand for about 250 waffles in one hour, one operator with the electric irons could do the work of two with gas; the smoke nuisance was eliminated, the saving in oil was considerably more than half that required for gas, and subsequently, recent improvements in electric waffle irons have resulted in the elimination of the use of oil entirely. Another curious thing is that it takes about 20 per cent less batter with the electric iron for the same number of waffles than was required with gas. The reason appears to be that the cooking is done much more quickly; hence, a lighter article is produced.

"The electrical industries still lead the van of human progress. The electrical engineer, in the highest sense of the word, is the resultant of all engineering experience, and to the engineers of the world—if I may include inventors as engineers—more than to all other professions combined, the civilization of the present day is due.

Experience Should be Represented

". . . I . . . should like to say that I heartily indorse the idea . . . that in the organization of our electric-light companies, our telephone properties, and our street-railway properties the capitalization should represent the experience; it should also represent the foresight, the courage, the ingenuity and the inventiveness, that go to create these properties. These elements are just as much factors in the development of the property—although less easy to estimate as to value—as are the dynamos, steam turbines and pole lines that constitute the physical part of the plant. . . ."—W. C. Martin, "Report of the Committee on Progress."

1929
Growth and Expansion

Electric Energy Substituted for Hand Labor

The youthful industry's vitality, potentiality for expansion, and increasing importance to the American economy were ably enlarged upon at the 1929 NELA Convention, which inaugurated Light's Golden Jubilee:

"Amid the rapidly expanding and changing character of electrical development, one policy stands out as having been uniformly and consistently followed by all and at all times. This is the policy of growth and expansion. The electric industry has been progressive; it has not stood still. From the beginning, the men responsible for electrical development have realized the enormous contributions in useful service which electricity has made and will continue to make to the whole national and community well-being, to workers and to homes, to all phases of economic and social life. They understand and assume the obligation to unfold the full possibilities of electric service and translate them into everyday use for all the people, on farm, in village, and in large city. In its plans, its construction of plants and facilities, its organization and financing, the industry has looked to the future. Not only has it quickly adopted advances, but it has stimulated and searched for them.

"Year by year, electric service extends; more homes are electrified, domestic use increases and takes on new forms; the service reaches to smaller and smaller towns and on to the farms; electricity is becoming the essential power supply for all purposes; the quantity of power made available for each worker increases. There lie ahead fields of still greater expectation for new and larger uses. The policy of aggressive development and expansion is still essential.

"Herbert Hoover made the following statement before the World Power Conference in London, 1924:

" 'The factor that has been primarily responsible for the tremendous changes of the last century and without which modern civilization could not exist is mechanical power. The form which in increasing degree such power is being applied is electrical energy—the greatest tool that has come into the hands of man. The degree to which we utilize this tool as a substitute for manual labor will largely determine the rate of our social and industrial progress.'

Rapid Progress

"Electrical development is progressing at a rapid pace. During the past seven years electrical service was furnished to 9,000,000 new homes, bringing the total to 19,000,000. . . .

"A distinct characteristic of electric progress in the last few years has been the extension of service to small towns and farms. . . . Not only do they enjoy the benefits of electricity in their homes, but by it the door of industrial opportunity has been opened to the smallest town having also reasonable transportation facilities. The spread of service to the farm continues, until now 500,000 farms are connected. The objective of electric service for all the people comes nearer and nearer to attainment.

"With the development of great interconnected systems and mass production of power, the factories and workers of the nation are increasingly turning to electricity for power supply. The total increase of 9,800,000 hp in the nation's industrial enterprises since 1919 has been in electric motors. President Hoover's Committee on Recent Economic Changes in the United States, in its report of May 15, after emphasizing the widespread higher living standards as characteristic of our national life, pointed out that the rise in the use of power has been three and three-quarters times faster than the growth in population, and then added:

" 'The increasing flexibility with which electricity can be delivered for power has enabled manufacturers and farmers to meet high labor costs by the application of power-driven specialized-machines, and power in the flexible form has penetrated into every section of the United States, including many rural areas. The survey shows that as a nation we now use as much electrical energy as all the rest of the world combined.'

". . . it should not be overlooked that all the rest of the world combined hitherto has, to a very large extent, followed the policy of governmentally owned and politically operated electrical supply, while this nation has followed the precept of the immortal Lincoln that 'in all that the people can individually do as well for themselves government ought not to interfere.'

"The benefits of improved efficiencies, better management, large-scale development, and advances in the art have been shared with the consumer. An outstanding characteristic of the past year has been rate reduction. The general cost of living continues at 70 per cent above pre-war levels; domestic electricity is 25 per cent under pre-war levels. In 1914, the average household used but 268 units of electricity; in 1928, the average used was 456. Beyond this electricity today will do more than it was possible for it to do then, for scientific advance has provided the consumer with better and additional methods of utilizing it.

"Ours is a responsibility for bringing to the American people the best electric service at lowest possible cost which human capabilities can accomplish."—W. W. Freeman, "Report of the Public Policy Committee."

Technical Achievements

In another presentation before the 1929 convention, some of the technical achievements made in the first 50 years of industry existence were described:

"The major advances in the art of power production from the beginnings of the electrical industry have come through that industry. Without these inventions and improvements, there could have been no large scale substitution of mechanical for hand labor. Let me briefly summarize these advances: The reciprocating engine was developed to its maximum size and efficiency; the steam turbine, known to Nero in 100 B. C., remained impractical until its combination with the high-speed electric generator and is the major development in steam utilization in the last half century and now the world's principal prime-mover; hydro turbines and the whole conception of hydroelectric development have reached their furthest advance in the utilities. . . .

"The trend is toward larger and more efficient units for power production. Size of turbine and generating units has increased in ten years from 40,000 kw to 108,000 kw. Single power houses are under construction to house 1,000,000 hp. These huge power stations—the hearts of the electrical systems—are outstanding marvels of engineering accomplishment. Average quantity of fuel burned per kilowatthour in 1919 was 3.2 lb. Continued improvement in power house design and operation pushed this average consumption per kilowatthour to 1.76 lb for 1928. The aggregate saving due to gains in efficiencies since 1919 amounts to 180,000,000 tons.

Research and Development

"The Association is directing aggressive attention to transmission and distribution, design, construction methods, operating and maintenance practice, and safety rules in both overhead and underground systems. High-voltage cables are under experimental research. Ways are being sought to transmit more economically the increased quantities of power in both overhead wires and underground cables, in spite of conditions increasingly difficult due to congestion. Marking and lighting of power structures within airways, power line crossings over railroads, coordination of the operation of our service with telephone, telegraph, train control, and radio—all involving important relations with other public services—are enlisting your Association's consideration.

"Our engineers have focused particular attention toward sound, advance planning of whole electrical systems, anticipating future requirements of the communities served, and visualizing the step-by-step placement of power houses and transmission structures to meet adequately the power requirements of each locality at minimum cost. Because of this system planning, electric power facilities, taking the coun-

(*Continued on page* 88)

Diverse Accounting Problems to be Studied at EEI-AGA Accounting Conference in Boston

SPONSORED by the Accounting Division of the Edison Electric Institute and the Accounting Section of the American Gas Association, the National Conference of Electric and Gas Utility Accountants, meeting in Boston for the first time, will be held at the Hotel Statler on April 12-14, 1954. Answers to many of the most challenging problems in the utility accounting field, as well as solutions to a wide variety of everyday accounting problems, will be proposed by national authorities teamed with industry leaders at the forthcoming meeting.

General Session

The general session, to take place on Monday afternoon, April 12, at 2 p.m., will be presided over by William D. Virtue, Public Service Co. of Colorado, Chairman of the EEI Accounting Division Executive Committee, and by Paul E. Ewers, Michigan Consolidated Gas Co., Chairman of the AGA Accounting Section Managing Committee. A welcome to delegates will be extended by AGA President E. H. Eacker, President of Boston Consolidated Gas Co., and by Thomas G. Dignan, President of Boston Edison Co.

A highlight of the session will be a presentation by Beach J. McMillen, The Cincinnati Gas & Electric Co. As chairman of one of the most ambitious projects ever undertaken by the EEI-AGA accounting groups, Mr. McMillen will unveil the results of some four years of planning, research, and development—a professionally prepared, industry-tailored training package, designed to help teach employees the techniques of making friends of customers.

Discussing the economic picture will be Martin R. Gainsbrugh, Chief Economist of the National Industrial Conference Board. Among other activities, Mr. Gainsbrugh is also Technical Advisor to the Bureau of the Census and Bureau of Labor Statistics and Chairman of the Business and Economic Statistics Section, American Statistical Association.

W. D. VIRTUE

Chairman of the Accounting Division Executive Committee

Dr. Kenneth McFarland, Educational Consultant for General Motors Corp., will conclude the general session. While he has attained national prominence as an educator, his accomplishments extend beyond the academic field. Through extensive travel and work with management groups in many industries, he has acquired a broad knowledge of business. His message will have special significance to utility leaders engaged in accounting, finance, and related functions.

General Activities Groups

A combined session of the General Accounting, Depreciation Accounting, Taxation Accounting, and Accounting Employee Relations Committees will take place on Tuesday morning, April 13. Presiding will be the coordinators of the General Activities Groups, E. E. Roll, The Detroit Edison Co., for EEI, and Arthur Skelton, The Peoples Gas Light and Coke Co., for AGA. Such topics as indoctrinating new supervisors, economic depreciation, the news on the system of accounts, accounting problems of accelerated depreciation, the new look in income tax administration, and the new revenue bill will be discussed.

Also on Tuesday morning there will be a combined session of the Customer Activities Groups, presided over by their coordinators, J. G. Ross, Rochester Gas and Electric Corp., for EEI, and L. R. Quad, Public Service Electric and Gas Co., for AGA. Presentations to be given will deal with the importance of merchandise credit, effect of modern customer accounting techniques on customer relations, and orientation of supervisors.

The Customer Activities Groups will again meet in combined session on Wednesday morning, April 14, when changes in customer paying habits, a technical approach to a systematic and comprehensive employee training plan, and high-bill "headaches" will be the subjects of discussion.

Depreciation and General Accounting

The Depreciation Accounting Committees' sessions on Tuesday afternoon and Wednesday morning will be presided over by C. N. Rice, Jr., Northern States Power Co., for EEI, and W. J. Foster, Jr., New York State Electric and Gas Corp., for AGA. Discussions of depreciation on construction work in progress and actually in service, court and commission rulings in 1953, and the significance of computed depreciation reserves will take place on Tuesday afternoon. On Wednesday morning a panel discussion of economic depreciation will be presented.

In addition to participating in the Tuesday morning General Activities session, the General Accounting Committees will present half-day programs on Tuesday afternoon and Wednesday morning. Presiding will be A. R. St. Bernard, The Cleveland Electric Illuminating Co., for EEI, and A. V. Schwartz, Columbia Gas System Service Corp., for AGA.

Among the discussion topics will be current methods used in accounting for materials and supplies, including machine accounting applications, reports issued, accounting for

stores expense, and other related information. In addition, the experience of companies in recent rate cases involving determination of working capital allowance will be reviewed, including certain methods in computing such allowance.

Financial reporting practices and trends, as disclosed by an analysis of 1952 annual reports and a review of available 1953 reports, will be examined. There will also be a presentation on the extent and scope of reports to top management and directors, outlining the results of a 20-company study. How forms management will reduce costs and provide better control, the significant accounting changes in the proposed revision of the NARUC uniform system of accounts for electric and gas utilities, the development of principles underlying responsibility forecasting, and the importance of man-hour forecasts vs. dollar forecasts will be among other topics to be considered.

Internal Auditing

L. D. Brumit, Florida Power Corp., for EEI, and J. D. Hogan, Michigan Consolidated Gas Co., for AGA, will preside over the sessions of the Internal Auditing Committees. At the Tuesday morning session, a panel consisting of three management representatives will relate their personal experience with and opinions of internal auditing. At the afternoon session an outside speaker from the field of education will deal with internal auditing as an aid to management, and on Wednesday morning the traditional work-shop panel discussion will take place.

Plant Accounting, Property Records

Presiding over the three sessions of the Plant Accounting and Property Records Committees will be C. W. Kelsey, New York State Electric and Gas Corp., for EEI, and A. J. Brodtmann, New Orleans Public Service Inc., for AGA. At the Tuesday morning session, three topics will be discussed: the functions of property records departments, the type of personnel required for these departments, and the procedure manuals which these departments should prepare to acquaint personnel of related departments with the requirements of the property records system.

In the afternoon there will be a panel discussion, and the Wednesday morning session will deal with methods of handling specific phases of property records work, including underground continuing property records, general equipment records, age records, and the use of punched cards in property records work.

In addition to cooperating in the Tuesday morning General Activities session, the Taxation Accounting Committees will convene on Tuesday afternoon and Wednesday morning. S. J. Schiml, The Dayton Power and Light Co., for EEI, and J. W. Balet, Consolidated Edison Co. of New York, Inc., for AGA, will preside.

Accounting for underground gas storage will be discussed on the basis of answers to a questionnaire submitted to industry companies. The activities of the Taxation Accounting Committees in the legislative field will be reviewed, and technical aspects of pending legislation and its effect on utilities will be covered. The present status of accelerated amortization, including some of the technical problems involved, accounting for capital exhaustion, tax treatment of rate increase under bond, treatment of interest on deficiencies, new income tax forms and regulations, and sale of unbilled revenue will be among other subjects to be considered.

Accounting Employee Relations

The Accounting Employee Relations Committees, headed by J. D. Elliott, The Detroit Edison Co., for EEI, and H. E. Steiner, Niagara Mohawk Power Corp., for AGA, will conduct a Wednesday morning meeting dealing with employee attitudes and morale.

Topics bearing on the usefulness of rest periods, rules vs. administrative judgment, controlling absences, and the employee at maximum pay will be discussed, with time allotted to audience participation after brief introductions by discussion leaders. The committees are also sponsoring the presentation on indoctrination of new supervisors at the Tuesday morning sessions of the General and Customer Activities Groups.

Headed by G. F. Higgins, The Detroit Edison Co., for EEI, and E. K. Schneider, The East Ohio Gas Co., for AGA, the Customer Accounting Committees will present a diversified program of interest to both large and small companies. In addition to participating in the Customer Activities sessions, the committees will, at noon on Tuesday, hold a luncheon meeting that will extend into the afternoon.

Such subjects as field supervision of meter readers; procedures relating to the receipt, distribution, and posting of cash payments; simplification and reduction of reports prepared for the purpose of rate analysis, load studies, etc.; minimum requirements for and methods of controlling meters and maintaining customer count; and a new approach for controlling costs and effecting efficiency by the measurement of man-hours will be discussed. Time will be allowed for discussion from the floor.

Customer Collections

Presided over by T. C. Eickmeyer, The Dayton Power and Light Co., for EEI, and R. B. Mitchell, The Peoples Gas Light and Coke Co., for AGA, the Customer Collections Committees will also hold a Tuesday luncheon session that will extend into the afternoon.

Principal speaker at the session will be E. S. Boardman, Assistant Vice President of the Federal Reserve Bank of Boston, whose talk will concern industrial production, factory employment and payrolls, consumer credit, national debt, and sales trends by industries. His talk will be supplemented by visual-aid charts. In addition, the benefits of close follow up on current accounts will be discussed, and observations on collection costs will be made. The committees will also participate in the Customer Activities sessions.

Customer Relations

C. J. Berner, Wisconsin Electric Power Co., for EEI, and J. H. Purdy, Consolidated Gas Electric Light and Power Co. of Baltimore, for AGA, will preside over the Tuesday luncheon and afternoon session of the Customer Relations Committees.

Topics for consideration will include staffing for customer contacts and why our customers get in touch with us, which will be followed by a general discussion entitled, "What's on Your Mind?" These committees,

(*Continued on page* 87)

Annual EEI Sales Conference to Stress Sales Training and Market Development

THE 20th Annual EEI Sales Conference, to be held at the Edgewater Beach Hotel in Chicago, April 5-8, comes at a time when more and more attention is being given to selling. With the day of the "order-taker" salesman past, the sales executives of the nation are faced with the problem of developing new markets, as well as personnel who can sell under highly competitive conditions.

With this in mind, the EEI Commercial Division, under the direction of J. Reed Hartman, Vice President of The Cincinnati Gas & Electric Co. and Chairman of the Commercial Division General Committee, has arranged a conference program designed to provide assistance to electric industry sales executives in their current commercial operations.

The conference will begin on Monday with the Home Service Conference and individual meetings of the Commercial Division Committees. Four sections of the division—commercial sales, farm, industrial power and heating, and residential — will hold all-day meetings on Tuesday. The general sessions will be held on Wednesday morning and afternoon and Thursday morning, with a general luncheon on Thursday noon concluding the conference.

General Sessions

Mr. Hartman will preside at the general sessions, opening them on Wednesday morning. In a short address he will report on committee activities during the past year, citing accomplishments and outlining current projects.

Walter H. Sammis, Institute President and President of Ohio Edison Co., will discuss "That 100,000,000th Kilowatt." He will deal with the industry's present status and its future in the coming few years. Merryle Stanley Rukeyser, business writer and economist who has appeared at several previous conferences, will present his views on current business and economic conditions in a talk entitled "Transition to Dynamic Normalcy."

J. R. HARTMANN
Chairman of the Commercial Division General Committee

A dramatic presentation, "You Think You Know, Irma," will tell about the prize awards presented annually through the Institute. Concluding the morning session will be Harry Restofski, Chairman of the EEI Prize Awards Committee and Vice President of the West Penn Power Company, who will announce the winners of the Thomas W. Martin Rural Electrification Award; George A. Hughes Awards for electric appliance promotion; Laura McCall Awards for home service activities; Planned Lighting Awards; Frank Watts Awards for promotion of electrically operated farm equipment; George Westinghouse Awards for promotion of electric laundry equipment; and More Power to America Award for advances in industrial electrification.

The Wednesday afternoon session will be opened by Roy W. Johnson, Executive Vice President of General Electric Co., whose address, "More House-Power to You," will survey market conditions in the electric appliance field. There will also be a presentation, "The Jubilee Meets the Press," that will show what companies throughout the nation have done or are planning to do for Light's Diamond Jubilee.

Tom Fort, Vice President of Westinghouse Electric Corp., will discuss "The Future of Industrial Power," outlining the opportunities existing in the field of industrial electrification. Concluding the afternoon session will be Dr. Neal Bowman, National Association of Manufacturers, with a talk entitled "Dollars and More Sense."

Leading off the Thursday morning session, William A. Lyons, Vice President of New York State Electric & Gas Corp., will discuss opportunities for greater farm utilization of electricity, in a presentation entitled "Our Stake in Agriculture." Dr. Claude Robinson, one of the country's foremost authorities on advertising research, will tell "How to Increase the Efficiency of Advertising."

George E. Whitwell, Vice President of Philadelphia Electric Co., will discuss "Specialty Selling — A Lost Art?" drawing upon his many years of selling experience to compare the salesmanship of today with that of yesterday. Closing the Thursday afternoon session will be Robert A. Whitney, President of National Sales Executives, Inc. In his talk, "The Two-Way Look for 1954," he will tell of the sales opportunities existing in our nation and of the need for better selling in coming years.

The speaker at the general luncheon, which traditionally concludes the Sales Conference, will be Millard Bennett, Sales Management Consultant, who has established an outstanding reputation as a sales training counsellor and speaker. His address, "The Three Golden Keys," will deal with the human aspects that set selling and salesmanship apart from any other vocation.

Home Service Conference

Using "Be Modern—Live Electrically" as its theme, the Home Service Conference will be held all day Monday, with Miss Jane Grau, Duquesne Light Co., presiding at the morning session. After opening remarks by

Mrs. Harriet G. West, Chairman of the EEI Home Service Committee, Miss Lura Jim Alkire, Manager of the Consumers Institute, General Electric Co., will discuss "Range Buy Lines." Miss Eleanor Jones, Nash-Kelvinator Co., will talk on "Laundry Leisure," and a film, "Take It Easy," produced by Wayne University and the Michigan Heart Association, will be shown. The concluding speaker of the morning will be Miss Anna Bines, Home Service Director, Texas Electric Service Co., with her presentation, "Let's Have Breakfast."

The afternoon session will be presided over by Miss Edna Stephany, Pennsylvania Power & Light Co. The first speaker will be Mrs. Adelaide Fellows, Director of Home Economics, Philco Corp., whose topic will be "Freeze It." Mrs. Florence P. Hanford, Supervisor of Home Economics, Philadelphia Electric Co., will discuss "T.V. Lore in 1954," and Miss Elizabeth Williams, Home Service Director, Monongahela Power Co., will speak on "Lighting for Better Living." The final speaker of the day will be Miss Willie Mae Rogers, Director of Good Housekeeping Institute, whose talk will be entitled "We Are All Selling."

At the home service breakfast, which will be held on Tuesday morning, those attending will hear the Honorable Ivy Baker Priest, Treasurer of the United States, present a talk entitled "To Date."

Commercial Sales Section

Presiding at the morning session of the Commercial Sales Section meeting on Tuesday will be C. M. Wallace, Jr., Chairman of the EEI Market Development and Electrical Applications Committee. After opening remarks by Shelley S. Sansbury, Chairman of the Commercial Sales Section, Edwin Vennard, President of Middle West Service Co., will describe the "New Reasoning for Net Return."

The rest of the morning will be devoted to the subject of developing profitable commercial loads, with B. D. Painter, Commercial-Industrial Sales Supervisor, Appalachian Electric Power Co., speaking on commercial cooking; A. W. Smith, Sales and Advertising Consultant, Ebasco Services Inc., discussing commercial lighting; and R. I. Bull, Commercial Sales Supervisor, The Ohio Power Co., covering commercial air conditioning and the heat pump.

At the afternoon session, R. W. Butts, Chairman of the EEI Commercial Lighting Committee, will preside. A panel discussion of the morning program will be held, with L. E. Taylor, Director of Commercial Lighting Sales, The Detroit Edison Co., serving as moderator and the speakers from the morning program serving as panel members.

There will also be a description of "A Small Company's Commercial Cooking Program" by G. A. Weatherton, General Commercial Manager, Kentucky & West Virginia Power Co., and a talk on "Growth Problems in Air Conditioning" by George S. Jones, Jr., Managing Director of Air Conditioning and Refrigeration Institute.

Farm Section

With "Teamwork" serving as its theme, the Farm Section meeting will be held on Tuesday.

Following opening remarks by E. D. Smith, Chairman of the Farm Section, a panel consisting of J. C. Cahill, Farm Service Coordinator, The Detroit Edison Co., L. H. Hammond, Manager of Domestic and Farm Sales, New York State Electric & Gas Corp., and Ross Mauney, Manager of Rural Sales and Development, Arkansas Power & Light Co., will discuss "The Farm Selling Team." M. O. Whithed, Rural Supervisor, Atlantic City Electric Co., will serve as moderator. The other speaker on the morning program will be Warren Bateman, Advertising Assistant, Georgia Power Co., who will speak on "Farm Advertising: Effective and Defective."

The speaker at the Farm Luncheon will be George A. Bowie, Public Relations Consultant.

Presiding at the afternoon session will be John L. Burgan, Director of Rural Development, New York State Electric & Gas Corp. Another panel discussion will be held, the subject this time being "The Farm Development Team." Panel members will be H. O. Roberts, Jr., Agricultural Supervisor, Central Power and Light Co., and A. H. Gray, Jr., Head of the Rural Development Department, Southwestern Gas and Electric Co., with Bud S. Moss, Manager of Rural Division, Georgia Power Co., serving as moderator.

The meeting will conclude with a talk by P. T. Montfort, Research Associate, Texas A & M College, on "Utilities' Farm Organization Team."

Industrial Power and Heating Section

P. W. McCormick, Chairman of the Competitive Service Committee, will preside at the morning session of the Industrial Power and Heating Section meeting, which is to be held on Tuesday. Section Chairman Maxwell Cole will open the meeting with a short talk and J. H. Coates, Industrial Sales Consultant, Ebasco Services Inc., will discuss "Future Industrial Markets." C. C. Shotwell, Assistant Manager of the Market Studies and Service Division, Philadelphia Electric Co., will discuss "Selling Industrial Lighting," and Dr. Louis T. Rader, Manager of the Specialty Control Department, Apparatus Division, General Electric Co., will end the morning session with a talk entitled "Cybernetics—The Automatic Factory."

With Maxwell Cole presiding, the afternoon session will open with an address by P. W. Emler, Director of Industrial Sales, American Gas & Electric Service Corp., on "The Heat Pump in Industry." W. T. Thagard, Administrative Engineer, Texas Eastern Transmission Corp., will discuss "Gas Pipe Line Pumping," and J. H. Ahrens, Industrial Sales Manager, The Hartford Electric Light Co., will describe the "Market for Metal Sheath Heaters." The final speaker of the day will be G. W. Schweers, Vice President and Director of Sales, General Machinery Division, Allis-Chalmers Manufacturing Co., whose topic will be "Selling in the Future Market."

Residential Section

The Residential Section meeting on Tuesday will open with a short talk by R. J. Miller, Chairman of the section. H. H. Brenan, Manager of the Residential Sales Department, Pennsylvania Power & Light Co., will describe "Coordinated Major Appliance Promotions," and C. C. Choyce, National Retail Sales Manager, Sears Roebuck & Co., will discuss "Chain Store Appliance Merchandising." M. E. Skinner, Vice President and Direc-

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Industry Connects Fifty Millionth Customer

THE electric industry is now providing electric service to more than fifty million customers within the United States.

The fifty millionth was reached on January 28 between 1 and 2 p.m., EST, according to calculations of the Edison Electric Institute based on the current rate of additions of new customers, with seasonal adjustments.

This bench mark in electrical progress was observed by many companies throughout the country in connection with the celebration of Light's Diamond Jubilee this year.

In commenting on the occasion, Charles E. Wilson, Chairman of the Sponsoring Committee of Light's Diamond Jubilee, observed:

"It is significant that this important milestone in the history of the electric industry should be reached during the year of the 75th anniversary of Edison's invention of the incandescent lamp. Edison's objective was to make electric light and electric service practical for everybody. Since there were not quite fifty million people in this country in 1879, the year he invented the lamp, that objective has now literally been achieved.

"Because the number of residential customers so closely matches the number of families in this country, the average electric customer is the average American. Actually, less than 2 per cent of American homes do not have electric service available to them."

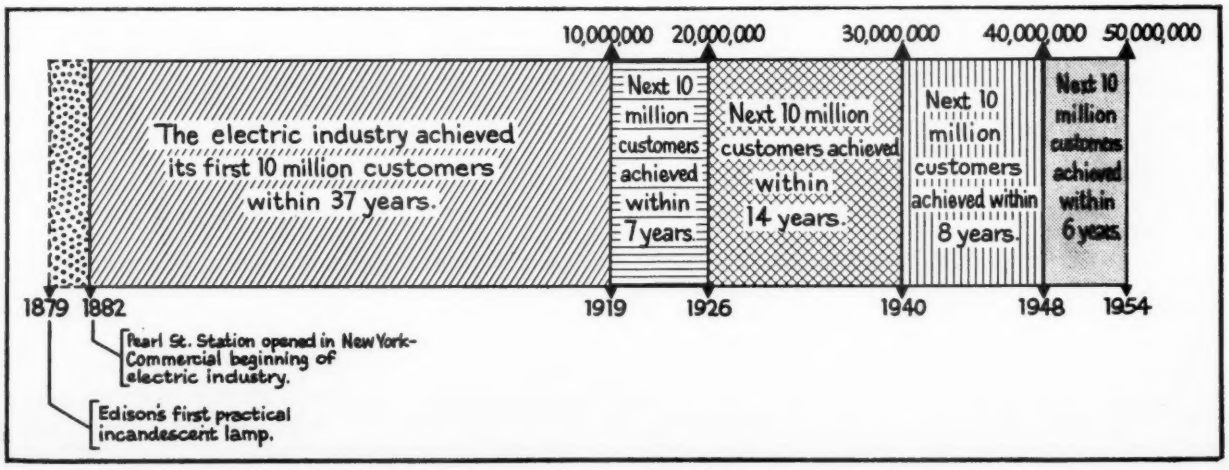
Twenty Leading Electrical Appliances

In the long and varied list of electrical appliances used in the home, the 20 heading the list at the beginning of 1954 are shown below in comparison with 1930. Of the 20 leading appliances at the beginning of 1954, only eight were listed in the January, 1930, issue of *Electrical Merchandising*. In addition to these, *Electrical Merchandising* also estimated that 29.4 per cent of the nation's wired homes had electric fans, and 5.9 per cent owned electric "cookers." Neither of these items are carried in the listing as of the beginning of 1954 by *Electrical Merchandising*. Where leaders are inserted, appliances were either not in existence in 1930 or the number in use was not significant enough to be listed.

	1954			1930		
Appliance	Ranking	Per Cent of Wired Homes With	Number in Use, January 1	Ranking	Per Cent of Wired Homes With	Estimated Number in Use, January 1
Radios	1	98.4	45,775,000	..	....	.....
Refrigerators	2	90.4	39,397,000	6	9.4	1,850,000
Irons	3	90.1	39,272,500	1	94.0	18,538,000
Electric Clocks	4	83.7	36,470,000	..	....	.....
Electric Washers	5	78.5	34,194,200	4	33.4	6,585,000
Toasters	6	71.9	31,350,000	3	37.1	7,325,000
Television	7	63.1	27,500,000	..	....	.....
Vacuum Cleaners	8	60.5	26,370,000	2	43.6	8,600,000
Coffee Makers	9	54.3	23,677,800	..	....	.....
Shavers	10	34.1	14,873,500	..	....	.....
Sandwich-Waffle Combinations	11	32.6	14,200,900	..	....	.....
Heating Pads	12	32.0	13,932,000	..	....	.....
Mixers	13	31.6	13,785,000	..	....	.....
Ranges	14	25.9	11,285,700	7	4.4	875,000
Steam Irons	15	24.7	10,770,000	..	....	.....
Portable Heaters	16	23.8	10,355,200	5	16.1	3,185,000
Water Heaters	17	14.7	6,412,800	..	....	.....
Freezers	18	13.7	5,954,700	..	....	.....
Bed Coverings	19	9.9	4,295,500	..	....	.....
Ironers	20	9.3	4,061,000	8	2.9	580,000

SOURCES: *Electrical Merchandising*, January, 1930, and January, 1954.

The present rate of additions of new customers to power lines in the United States is approximately 600 per hour, and many companies chose to recognize as symbolic of the fifty millionth customer one or all of their customers whose service was connected during the date and hour in which the calculations indicated that the fifty millionth customer would be attained. These special recognitions, emphasizing the significance of the contributions to American life now being commemorated in the Diamond



Jubilee celebrations, were made in many instances with appropriate ceremonies. Frequently included were gifts of electrical appliances to the new customers and installation of suitably inscribed gilded meters.

Among those connected during the hour were urban and rural families, laborers and professional people, a new chain grocery, newlyweds who are establishing their own homes and persons who have retired from their business careers, and an immigrant and a man living in a small community where both of his parents had spent their entire lives.

At least one family had been handicapped financially by a fire which totally destroyed a former home and most of their possessions; another family was beginning a new way of life in a home which had been specially designed for a wheel chair patient—a man who was disabled physically during World War II.

First Central Station Customers

The first customers of a central station designed to supply all-purpose electric service were the 59, who in 1882, were the initial consumers of electric current from Thomas A. Edison's Pearl Street Station in New York. That station and its distribution system were a direct sequence of his lamp and his concurrent devising of an electric generator whose efficiency startled the scientific world.

In 1904, 22 years after the opening of the Pearl Street Station, the infant electric industry reached its first million customers. Its ten millionth was reached in 1919. In the seven years from 1919 to 1926, following the pent-up needs of the First World War period, the beginning of widespread acceptance of electric service, and a period of general expansion second only to that of the present, an additional ten million customers came on the lines of the power companies.

Within the 14-year period, 1926-1940, the industry reached its thirty millionth customer. Within the 1940-1948 period, an additional ten million customers began to take service.

The ten million customers acquired in the six-year period, 1948-1954, brought the total to fifty million, a bench mark fittingly coincident with the Diamond Jubilee of the electric lamp and a token of electricity's continuing production miracles in industry and in lifting of burdensome toil, in homes, factories, offices and farms.

Accounting for more than eight out of every ten electric customers is the residential classification which numbered 41,975,000 at the beginning of 1954.

Commercial customers make up the second most numerous classification. About one out of every ten customers is in the commercial classification. As a consuming group, commercial customers rank third in magnitude.

Industrial customers, the largest consumers of electricity, numbered 275,000 at the beginning of 1954.

Thoughts on a Bench Mark and an Anniversary

WHEN the fifty millionth electric customer of the electric industry began taking service on January 28, 1954, it is certain that electricity had already played a large part in his life—under his parents' roof, in his job, in practically anything he did. As the fifty millionth customer, he might have been setting up his own household, his own business or farm.

He may be very much like his neighbor who fits a statistical composite of a typical electric customer, whom we shall call John Householder.

Mr. Householder is fortyish, married, with a couple of children. Odds are more than even that he has an automobile, owns his own home, is a church member, belongs to one or more fraternal or social organizations, is a baseball fan, carries life insurance, has money in the bank, and is a good credit risk. His income is a secret shared only with the tax collector.

By present-day standards he is like most of us in his mode of life. But if his commonplaces of living are compared with the luxuries of bygone days, he is a remarkable figure indeed, enjoying living conditions unattainable by the richest of ancient kings.

Basis of High Living Standards

Electricity, perhaps more than any other single factor, has brought this living standard into being. Through electric service, Mr. Householder has at his family's command the aggregate energy of 35 servants working a 40-hour week in his home the year round. With marvelous versatility, his electrical genie provides lighting and operates the nine appliances he is almost sure to own—his television set, radio, iron, refrigerator, electric clock, washer, toaster, vacuum cleaner, coffee maker. In addition, he and his wife probably have two or more other appliances. They might include an electric shaver, sandwich toaster, heating pad, mixer, waffle iron, range, steam iron, water heater, freezer, space heater, or ironer.

Taken for Granted

The myriad contributions which these and other electrical applications make to the comfort, health, entertainment, and general well-being of Mr. Householder and his family are so much a part of his life that existence without them would be difficult to comprehend.

Mr. Householder is like most of us also, in that he takes the daily electrical miracles in his life for granted. If he were to pause in this Light's Diamond Jubilee Year of 1954 and think back to 1929, when he was in his mid-teens, he might be amazed at what has happened in the comparatively short space of 25 years.

In 1929, the year of Light's Golden Jubilee, the wonders of electrical progress were being hailed. Fifty years earlier, Thomas Edison had developed the first practical incandescent lamp, and, during the 1929 anniversary, he himself expressed amazement at the advances which had been made. But in 1929, only a fraction of the array of today's electrical appliances were in common use, and there were fewer than 25,000,000 electricity customers, less than half the present total.

As a boy, John Householder may have had a chance to show off the

family radio, still a relative novelty in 1929, appearing in less than half of America's then electrified homes. His mother undoubtedly had an electric iron, which was used by nearly all of 1929's "electrical" families. If she had a vacuum cleaner, her electrical living was above average. Such items as toasters and washers were even less common. So John may easily remember that in 1929, the ice man still came to fill the ice box, clothes washing was still a back-breaking chore, and he may recall with some clarity wearying hours spent beating rugs draped on the clothes-line.

In 1929, the average annual use of electricity in the home was 502 kwhr. Before the end of this year, average residential use should be five times greater than the 1929 consumption.

Industry in its Infancy

John Householder's father can look back at his own boyhood days around the turn of the century. The electrical industry was still in its infancy then, there were fewer than one million electric customers, and the Householders were not among them. Many people were wary of such a new-fangled thing as electricity, and the industry itself had many technical problems to solve. The flameless, unflickering brightness of electric light had not yet reached the Householder home in 1900, and Mr. Householder, if he were not a city dweller, may recollect the endless trips he or his mother made to the well for water for cooking and washing, and the quantities of wood or coal which had to be carried to feed the stove.

The electrical revolution had not yet gained momentum in 1900, either in home or factory. The senior Householder may recall the old mills with flapping belt drives, and how a factory worker at the turn of the century earned about $9 for a 54.5-hour week. At that time, the worker had the electric power equivalent of only two helpers, while some 50 years later he had the equivalent energy of 210 men working with him on his job all year long. In 1953, a manufacturing worker was averaging nearly $72 for a 41-hour week—over seven times the 1900 wages, for a work week shorter by one-fourth.

Because electricity has performed its miracles in industry as well as in the home, the Householders now enjoy an enormous outpouring of manufactured products of every description, at prices they can pay.

Commonplaces of Tomorrow

In this year of Light's Diamond Jubilee, 75 years after Edison invented his lamp and the electric service system which made possible the electrical era, the Householder children are growing up in a home where the electronic marvel of television seems as ordinary as running water. Yet, 25 years ago, this and other amazing electrical advances were hardly dreamed of by many people.

What will be the electrical living story 25 years from now at Light's Centennial in 1979? John Householder, then a grandfather, may see his family's use of electricity multiplied several times by a variety of new applications for household tasks, comfort, and convenience. Electronic devices that will cook his family's meals in a few seconds, year-round air conditioning which will keep his home's atmosphere dust-and-germ-free, room-to-room intercommunication systems, and lighting adjustable to all degrees of brilliancy and color may be among the Householder electrical servants.

But, if anything can be learned from the past record it is this—developments as amazing and unpredictable as any so far will be the commonplace of living in 1979.

Invigorating Air of Freedom

The United States achieved its leadership in electrical living in the invigorating air of freedom, which encouraged men like Edison to make the best use of their abilities, to the benefit of the entire world.

Electric companies, operating in the Edison spirit, and regulated by local and Federal government bodies, produce four-fifths of the nation's public power supply. The electric service they provide comes from a tremendous complex of generating stations, transmission and distribution lines, and countless other items of equipment—a plant investment at the beginning of this year of nearly $26,000,000,000.

The vital industry which these companies comprise is owned directly by some 3,000,000 stockholders, from every walk of life, as diverse as the customers their companies serve. Nearly every man, woman, and child in America has at least an indirect financial interest in electric company operation, through life insurance policies, savings, and other investments for security.

America's electric companies have unique responsibilities—to the communities they serve, to the national economy they energize, to every American. In the fulfillment of these responsibilities, the industry keeps before it as a guidepost Edison's statement in 1928: "The electrical development of America has only well begun. So long as there remains a single task being done by men and women that electricity could do as well, so long will that development be incomplete."

In that spirit, with three-quarters of a century of unprecedented service behind them, the nation's electric companies look to a future of limitless possibilities ahead.

EEI-AGA Conference to Meet in Boston

(*Continued from page* 82)

which will also participate in the Customer Activities sessions, played an active part in preparing the customer relations training project to be reviewed at the general session.

Under the chairmanship of F. J. Porter, Jr., Consolidated Edison Co. of New York, Inc., for EEI, and J. H. W. Roper, Washington Gas Light Co., for AGA, the Electronics Accounting Machine Developments Subcommittees will present an hour and one-half program, following a light luncheon at 12:15 p.m. The program will describe an actual electronics installation as applied to an accounting problem not in the utility industry and will then outline steps being taken by several utilities to prepare for electronics. Among the speakers will be L. E. Walkley and R. F. Osborn, General Electric Co.

The conference will sponsor the usual business machines exhibit for the benefit of registrants and a banquet on Tuesday evening. In addition, for the ladies, a sightseeing trip to places of historic interest will be provided.

Purchasing and Stores Committee Announces Program for Annual Spring Meeting

THE Seventh Annual Spring Meeting of the EEI Purchasing and Stores Committee, under chairmanship of C. H. zur Nieden, Philadelphia Electric Co., will be held at the Hotel Roosevelt, New York, N. Y., May 3-5, 1954.

During the morning and afternoon sessions on May 3 and 4 there will be numerous presentations and discussions designed to aid improvement of purchasing and stores activities. Under direction of Stores Vice Chairman W. M. Holls, Consolidated Gas Electric Light and Power Co. of Baltimore, reports prepared by project subcommittees will be given by their chairmen, as follows:

"The Value of Records in the Control of Inventory," F. R. Schaffer, Pennsylvania Power & Light Co.

"Why Salvage and Reclamation," R. A. Clark, The Detroit Edison Co.

"The Whys and Whereabouts of Reels, Drums, and Containers," T. E. Ryan, Consumers Power Co.

Reports of the project subcommittees under direction of Purchasing Vice Chairman J. Donald Hogg, The Cleveland Electric Illuminating Co., will also be presented by their chairmen:

"Fuel Purchasing Policies," J. J. Brennan, Northern States Power Co.

"How to Determine Policy on Foreign Purchases," J. B. Homsher, Gilbert Associates, Inc.

In addition, co-chairmen representing both purchasing and stores will present reports prepared by their project subcommittees:

"Purchasing and Stores Operations for Profit," R. H. Sperreng (Purchasing), Union Electric Co. of Missouri, and H. T. Simpson (Stores), Boston Edison Co.

"Modern Material Handling, Involving Suppliers, Purchasing, and Stores," J. Donald Hogg (Purchasing) and L. C. Alexander (Stores), The Cleveland Electric Illuminating Co.

"Are Consignment and Vendors' Stocks Advantageous," R. C. Wenz (Purchasing), Duquesne Light Co., and O. H. Aydelotte (Stores), Public Service Co. of Colorado.

A continuing project on "Unit Man-Hour Costs," compiled by R. S. King, Union Electric Co. of Missouri, Chairman of the project committee studying this subject, will be presented. H. E. Hodgson, Wisconsin Power and Light Co., Chairman of the Standard Packaging Committee, will also report on his committee's progress in extending its activity into fields other than "Line Hardware," which is still under study.

There will be luncheon meetings on May 3 and 4, which will be addressed, respectively, by K. F. Bellows, Consolidated Edison Co. of New York, Inc., and J. W. Carpenter, Long Island Lighting Co. May 5 will be devoted to visits to properties of Consolidated Edison and Long Island Lighting.

Since entertainment in New York is available in great variety, planned entertainment at the spring meeting has been limited to a social hour and dinner on the evening of May 3. For the ladies an attractive program is being prepared for the mornings of May 3 and 4.

Utility Fleet Operators to Meet in Montreal

THE 13th Annual Conference of Public Utility Fleet Operators, sponsored by the EEI Transportation Committee and the AGA Automotive and Mobile Equipment Committee, will be held in conjunction with the AGA Distribution, Motor Vehicles and Corrosion Conference at the Sheraton-Mount Royal Hotel, Montreal, Que., next April 20-23, it has been announced by D. K. Wilson, EEI Chairman.

As a result of favorable comment on last year's Symposium on Selection of Aerial Apparatus and Related Chassis, a Symposium on Applied Hydraulics has been scheduled for the Wednesday morning session this year. The symposium will open with a basic paper on hydraulics as applied to mobile machinery, to be given by M. J. Taup of Vickers, Inc. Mr. Taup's presentation will be followed by four papers on specific application of hydraulics by Roy Balogh, McCabe-Powers Auto Body Co.; J. Howard Holan, J. H. Holan Corp.; Wayne M. Pierce, Jr., Tey Manufacturing Co., and Don B. Smith, Hydrocrane Division, Bucyrus-Erie Co.

On Wednesday afternoon, the Hon. Fred N. Clarke, Commissioner of Motor Vehicles, State of New Hampshire, will address the conference on the subject "Vehicular Safety from an Enforcement Point of View."

On Thursday morning, A. V. Brashear of Michigan Consolidated Gas Co. will present a paper on fleet operation, from management's point of view. His talk will be entitled "My Dream Fleet."

Other portions of the conference will be devoted to the showing of equipment films, panel and round-table discussions, and interim subcommittee reports.

What They Were Saying

(*Continued from page* 80)

try as a whole, are located and constructed for maximum utilization, most economic operation, and without wasteful duplication." — P. S. Arkwright, "The President's Address."

Edison himself expressed amazement at the strides that had been made in electric service but foresaw that much remained to be done in the years ahead. Though he was unable to attend the 1929 convention, he addressed delegates through the medium of the motion picture, stating, in part:

"I am proud of the electrical industry—of its vision, courage, zeal, and devotion to public service; and I suspect every American feels the same way about it. . . . The record is wonderful; but, fine as it is, it can be made still better and I have a feeling that in your hands it will be."

Twenty-five years have passed since those words were spoken, 25 years in which the industry has consistently proven its vitality and inventiveness. But, as the 22nd Annual EEI Convention prepares to meet, Edison's 1929 judgment is still pertinent: as fine as the record is, "it can be made still better."

Diamond Jubilee "Plan Book" and "Fact Book" Available

LIGHT'S Diamond Jubilee Committee, the organization heading the nationwide celebration this year of the 75th anniversary of Edison's incandescent lamp, has issued its two basic publications, *Light's Diamond Jubilee Plan Book* and *Light's Diamond Jubilee Fact Book*. Appropriately, these books dealing with the work of Thomas Edison and the advances resulting from it were published on his birthday, February 11.

Suggests Jubilee Activities

Both the *Plan Book* and the *Fact Book* were conceived to furnish all Jubilee participants with specific suggestions on how the Jubilee can be observed and to supply information for relating the electric industry story to the public.

The 32-page, illustrated *Plan Book* details plans and suggestions for Jubilee activities by all segments of the electrical industry, including power companies, manufacturers, dealers, and service companies, among others. It also lists the members of Light's Diamond Jubilee committees and organizations participating in Jubilee work. To date, seven months before the climax of the Jubilee will be reached in October, over 200 companies are taking part in the Jubilee and more companies are being added steadily to the list of participants.

Charles E. Wilson, Chairman of the Sponsoring Committee for Light's Diamond Jubilee, has written a statement appearing at the beginning of the book. In it he says, "Light's Diamond Jubilee gives our industry an opportunity to show the American people what the electrical progress of these past 75 years has meant to their lives."

The text starts with an explanation of what Light's Diamond Jubilee is and what its celebration signifies. It is pointed out that the entire country can join in celebrating the Jubilee and in recognizing the great record of electrical progress.

General plans of action for each of the three principal areas of activity—community celebrations, national celebrations, and national publicity—in which the Jubilee observance will be carried out are presented. Community activities, the most important of these areas, are emphasized. The book offers suggestions on how a company can set up a Jubilee planning committee of its own and how that committee can execute community celebrations and observances of the Jubilee. A special section for electrical manufacturers on cooperative and individual participation is included.

The last half of the book describes extensively the materials available for use in community Jubilee activities. The reader is advised as to where to get such materials and is given ideas on how to use them. Photographs of many of the materials appear in the book along with their descriptions. Included in this listing are Jubilee Committee publications, the Jubilee Medallion, stickers, a film on electrical progress, photographs, a postmark ad plate, souvenir items, display material, streamers, and films on electric company operations.

The suggested community activities and the descriptions of available Jubilee materials are given as starting points for a practically unlimited number of ideas that can be applied to Light's Diamond Jubilee. A section detailing a few of these ideas, which include plans for lighting arrangements, window displays, pageants, and parades, is offered.

Advertising and publicity—activities of every company—are important Jubilee tools. Many participants will want to run advertising and send out publicity using the Jubilee as a theme. Some ideas about how the Jubilee can be tied in with these company functions on a community level are presented along with suggestions for direct mail and promotion material. An entire page of art work illustrating ideas for letterheads, publications, leaflets, bills, envelope stuffers, ads, and company periodicals is included in this section.

A Compendium of Basic Facts

The *Fact Book*, a 92-page compendium of the most important facts about the electrical progress of the past 75 years and of the immediate future, is presented as a series of 21 articles, each simply written in layman's language.

Since the principal objective of Light's Diamond Jubilee is to tell the story of the contributions electricity has made and will continue to make to America's social and economic progress, the *Fact Book* was designed to furnish general information about electrical progress to help in telling this story.

In addition to being useful to anyone interested in the Jubilee, this book will be especially helpful to those concerned with creating advertising, publicity, and display copy, with speech writing, and with furnishing information about the Jubilee to writers, educators, and civic leaders. The book has been organized so that its user needs only to refer to the specific subject in which he is interested. It is not designed for cover-to-cover reading, but contains short, self-contained articles, each dealing with one of the phases of electrical progress, from generation to application.

Contents Wide in Scope

Starting with an article on the history of the incandescent lamp, the *Fact Book* goes on to discuss the growth of electric service, and the applications of electricity in the home, in business, in agriculture, and in industry. Other articles present the stories of electricity's contributions to science, medicine, transportation, and so on.

Facts and figures on the production of electric power in America and in the world, together with other data and information about the electric industry, are presented in easily understood terms. The phenomenal workings of electricity and the yet-to-be-realized miracle of atomic power in industry are among the wide variety of interesting topics about the electric industry that are covered in following sections.

The book finishes with articles which include a biographical sketch of Edison, a section giving simplified explanations of the fundamentals of electrical progress, a listing of the significant dates in that progress, and a story of Edison as a pioneer of industrial research and as the man who exemplified American enterprise and initiative by inventing the lamp which lighted the way for 75 years of electrical progress.

Both books are wide in scope and

coverage and can be used hand-in-hand—the *Plan Book* suggesting ideas for Jubilee celebrations and the *Fact Book* offering data and background for helping to carry out such celebrations. While the *Fact Book* tells the electric industry story succinctly and fully, the *Plan Book* is somewhat different. Its value lies not so much in what it sets forth as in the activity it stimulates. Its contents should be considered as a basis for the development of useful ideas. As Jubilee activities progress and as additional material and ideas are conceived, they will be described in forthcoming issues of the Jubilee *Newsletter*.

The books have been attractively designed as companion pieces, both having similar covers. The *Plan Book* has a blue cover with a gold and white design, while the *Fact Book* has a white cover with a blue and gold design.

Each organization participating in the Jubilee has been sent a free copy of the *Plan Book*. Additional copies of the *Plan Book* may be ordered at $1.25 each; in quantities of 25 or more, price per copy is $1.00. The *Fact Book* prices are $1.00 each for one to 24 copies; $.75 each for 25 to 99 copies; and $.50 each for 100 or more copies. An order blank for the books, which also lists available Jubilee materials, will be sent upon request to Light's Diamond Jubilee Committee, 2650 Graybar Building, 420 Lexington Ave., New York 17, N. Y.

Sales Conference

(*Continued from page* 84)

tor of Sales, Union Electric Co. of Missouri, will conclude the morning session with a talk entitled "Hot and Cold (Electric Heating and Air Conditioning)."

Leading off the afternoon session will be D. A. Packard, Vice Chairman of the Major Appliance Division, NEMA, who will discuss the "NEMA Appliance Programs for '54." D. C. Slipher, Chairman of the Electrical Subcommittee, National Association of Home Builders, will describe the "Builder's View of New Home Wiring," and a discussion of "Market Research as a Utility Sales Tool" will follow. Concluding will be a talk on "Higher Wattage Water Heating" by George T. Bogard, Manager of Utility Sales, General Electric Co.

To the Future Engineer

The following stanzas and accompanying text were presented by their author, H. M. Jalonack, General Electric Co., to the EEI Transmission and Distribution Committee.

AN old and true saying is that "Man does not live by bread alone." He requires, in addition to his financial advancement, a sense of importance, a recognition by his associates that he is contributing in an important way to progress in his chosen field, and employment in a profession that challenges his alibity by new and difficult problems. If these characteristics are present, his daily work will provide continuing enjoyment, which it should do, since so many hours of his life are spent at it.

Such a profession is engineering. In one of its fundamental areas—the light and power industry—there exist problems associated with its rapid and continuous growth that will challenge the ingenuity and pioneering spirit of engineers for decades to come. Here is a wide open field for the new engineer; here is an opportunity to find all of the basic requirements of a pleasant, challenging, and rewarding career.

Yet many of our young men with the necessary talent for engineering growth and leadership turn away from this fertile field to other pastures that look greener. They seem to feel that all the major problems have been solved; that the pioneering days are over; that the important questions have all been answered; that engineers, particularly in the light and power field, lead a humdrum and monotonous existence, unchallenging and unrewarding. How far from the truth this is!

Electric industry engineers are confronted daily with many difficult technical problems, which it is their duty to solve. I hope I am not presumptuous in suggesting that it is also their duty to their companies, to their profession, and to a new generation to tell of the opportunities and enjoyment to be found in their type of engineering. With the thought that I might help in some way to make young men seeking their future careers realize the desirability of the engineering profession, I have written these stanzas, "To The Future Engineer," and have dedicated them to the Transmission and Distribution Committee of the Edison Electric Institute. I hope they may prove both pleasant and useful.

Great river of electric power
Flowing downward from your source
Of human knowledge and inventive mind—
Sweeping before you, every hour
You flow, with resistless force,
Darkness and burden from mankind!

Building on banks along your flow
Great industries to fill the needs
Of man, and making fertile plains with soil
Swept from high places, wherein may grow
New happiness and comfort from the seeds
Of other minds and their inventive toil.

In years gone by there has been many a one
Who had the vision, courage, and the mind
To cut the channel, start the river's swing,
Send its dynamic force upon its way,
Loose its potential energy and unbind
The fluid essence of a living thing.

Their pioneering genius quickly found
Many a willing heart and able hand
To shape the channel, make the stream to grow,
Blast the rocks that held its power bound,
Carry it throughout the fields and land,
And find new places for its strength to flow.

But is such pioneering at an end?
Are there no power problems left for man?
Is the channel shaping quite complete?
Or will youth find around the river's bend
Construction more ingenious he could plan,
New challenges that he alone might meet?

The answer is plain — that early surge of force,
When the great power river started on its way,
Is still dynamic all along its length,
Demands still more from those who shape its course,
Brings new problems for solution day by day,
Grows still more useful, as it gathers greater strength.

Youth, you that now shape your future hour
For fair rewards to justify your work—
If you would choose a life where work is fun,
Then you'd do well to enter light and power
And help solve problems that lesser men might shirk,
Great opportunity for you has just begun!

—H. M. JALONACK

Prime Movers Committee Meeting

W. L. Chadwick, *Chairman*

THE Prime Movers Committee meeting, held at the Sir Walter Hotel in Raleigh, N. C., on February 1-2, 1954, was highlighted by more than five hours of round-table discussion. With a minimum of time being allocated for subcommittee reports, research projects reports, and other committee activities, approximately 50 round-table topics were informally discussed by the 80 members and guests in attendance.

Round-Table Period

Under the direction of H. Weisberg, the round-table period included informative reports on power station start-up experiences, plant design practices, station operating procedures, and equipment performance, in addition to the consideration of particular problems submitted by electric power companies in all parts of the country. By providing a unified approach to the common problems of power generation, the round-table discussions of the Prime Movers Committee contribute to the advancement of the electric industry.

Reports from several members called attention to continuing efforts being made to assure removal of foreign matter from the steam systems of new boiler-turbine installations prior to initial operation. With increasing experience in the starting-up of new units, a trend is evidenced toward acceptance of certain common practices. In addition to the use of temporary steam strainers installed in the steam piping ahead of the turbine, most companies have adopted the practice of carefully blowing-out new steam systems including boiler parts.

While steam is generally used as the scouring agent in piping blowouts, one company reported utilizing compressed air for this purpose. A motion picture made by Niagara Mohawk showed that such quantities of piping scale, welding beads, welding rod butts, machining chips, and other extraneous material have been discharged during "free-blowing" as to make this practice necessary. To insure further that new boiler tubing is free from obstructions, another practice is to shoot sponges through the tubes of new steam generators with compressed air. Possible damage to the turbine or related equipment is avoided in event any sponges are left in the boiler because the sponges disintegrate in the heat of the boiler before reaching the steam strainers.

With modern generators operating at increased hydrogen pressures, the quantity of this gas used by the electric industry has increased markedly during the past few years. One company, on reviewing its hydrogen consumption, found that 10,000 cylinders are handled in the servicing of its stations each year. Hydrogen handling methods are being simplified at some stations by the installation of permanent cylinder racks or large bottles in the station yards that can be refilled from the vender's trucks.

One company has provided dollies for handling hydrogen cylinders, each of which accommodates twelve bottles. The hydrogen vender delivers the bottles carried by the dollies. Not only does this method reduce handling but it also eliminates the hazardous practice sometimes employed by hydrogen vender employees of bouncing filled bottles off delivery trucks. The 12-bottle dolly is handled by a crane. To insure that only new cylinders are delivered to its stations, one company has manifolded cylinders in 100 bottle groups using bottles furnished by the vender for the company's use only. The vender contracts to keep the system filled and to maintain the manifold.

The repeated appearance of several power station problems has suggested studies by Prime Movers Committee subcommittees. With hundreds of thousands of dollars being invested in instrumentation and control in each modern large station, the committee is considering the establishment of a subgroup to study and analyze current control and instrument practices and the problems associated with them in power station design and operation. A temporary subcommittee was named under the chairmanship of W. Welch to survey and report on this matter.

Soot-Blowing Methods

Problems of soot-blowing methods and installations will receive increased attention from the Boiler Auxiliaries Subcommittee. A discussion of practices in regard to this equipment suggested the possibility that the optimum number of blowers had been exceeded in some cases. The subcommittee is under the direction of S. Moyer.

Power-station fire-control practices are being reviewed by the Turbines and Condensers Subcommittee, and the Fuel and Ash Handling Subcommittee is considering trouble experienced in coal-handling systems where hard to handle fuels are involved.

On the afternoon of the second day committee members and guests visited the Goldsboro Plant of Carolina Power & Light Co.

Accident Prevention Committee Meeting

R. P. Douglas, *Chairman*

REPORTS on the status of more than 20 projects sponsored by the Accident Prevention Committee highlighted its January 18-19, 1954, meeting in Boston, Mass. With 75 persons in attendance at the Hotel Statler, the safety directors of many New England electric companies participated with committee members in the two-day session.

Safety subjects of such import as electric shock and burn accidents—the industry's primary cause of injuries—resuscitation from suspended respiration due to electricity, rubber protective equipment for electric company linemen, safety training, and linemen's climbing tools are assigned for detailed consideration by subcommittees. These subgroups compile information, issue reports, and conduct surveys to supply the committee with data and methods that can effectively assist in the further improvement of the industry's accident experience. The subcommittees consist of commit-

tee members representing power companies in all parts of the country who bring together the experiences, test results, and practices of the industry's safety directors.

A recently initiated activity of the committee is the analysis of electric shock and burn accidents. The report of A. H. Doud, Sponsor of this project, further substantiated the general inferences of the committee's annual reviews of fatal accidents. Hand contacts continue to account for the greatest number of accidents, while linemen on poles are in most cases the victims. This activity will be continued by the committee in an effort to detail the underlying causes of accidents in the industry.

Training Media

Several media are developed by the Accident Prevention Committee to train electric company employees to work safely and to insure that attention is continually called to accident prevention. The Poster Subcommittee, under the chairmanship of F. G. Harriman, presented for the approval of the committee two posters, the 44th and the 45th in the series. These posters, prepared in color on 8.5- by 11-in. stock, are suitable for mounting on line trucks, in locker rooms, or wherever employees congregate.

Another training approach is considered by the Visual Aids Subcommittee. A. S. Hancock, Chairman, advised that films on the use and care of pole climbing equipment are being prepared from materials made available by members of the committee. This project should result in a reduction of fall accidents occurring on poles. The committee's fatal accident reviews indicate that each year between 5 and 10 per cent of the industry's deaths result from falls from poles or towers.

J. G. Dickinson presented for the approval of the committee the Safety Training Subcommittee's manual entitled *The Place of Safety in the Selection and Training of Employees*. This booklet, the first of a series of training manuals, was accepted for publication.

For the past three years a seasonal educational program has been sponsored by the committee to combat the annual increase in electric shock and burn accidents during the warm weather months. More than 100,000 sets of leaflets calling attention to particular hot weather hazards have been sent to linemen since the Seasonal Hazards Subcommittee inaugurated this program. R. H. Coleman, Chairman of this group, announced that an expanded program is being planned for the 1954 summer season. In addition to coordinated posters, leaflets, and crew leader letters, other manners of calling summertime hazards to the attention of the men in the field are being considered.

During the round-table discussion conducted by A. F. Randolph, 60 topics on accident prevention practices were considered. This informative discussion centered primarily around line stick testing, checking atmosphere in underground transformer vaults, motor vehicle safety, accident prevention in line construction, hazards encountered in the use of derricks and corrective measures, and company safety programs.

After discussing the January, 1954, issue of the *Exchange*, the committee's tri-annual publication detailing accidents of especial importance, J. Y. Andrews, the Editor, called attention to certain safety items on display. Of particular interest was a portable lighting cart designed and built by Boston Edison Co. to provide low-voltage illumination for work areas such as the interiors of condenser shells and boiler drums. The hand cart's apparatus included two transformers and four extension cords equipped with sealed-beam flood lamps. Operating on 8 v, each of the four units is capable of providing an illumination intensity of 90 ft-c at 6 ft distance. H. R. Kurth of Boston Edison Co. described an outdoor transformer repair job performed at night with the four low-voltage lamps giving adequate illumination.

Guest Speakers

Committee members and guests were welcomed to Boston by T. G. Dignan, Boston Edison's President. At the luncheon meeting on the first day, I. L. Moore, President of New England Electric System, addressed the group on the subject of "What Accident Prevention Means to the Utility Executive." On the morning of the second day, W. H. Seymour, Vice President, Loss Prevention Department, Liberty Mutual Insurance Co., spoke on "The Place of Research in Accident Prevention."

Meter and Service Committee Meeting

C. V. Morey, *Chairman*

SEVENTY-THREE members, correspondents, and guests convened at the Adolphus Hotel in Dallas, Texas, on February 3-5, 1954, for the joint meeting of the EEI Meter and Service Committee and the AEIC Committee on Metering and Service Methods. The meeting was devoted to subcommittee reports and round-table discussions concerned with the engineering, economic, and operating aspects of revenue metering. There was a review of past and present practice, and considerable attention was devoted to methods of making services and metering adequate for rapidly increasing residential and commercial loads. Attention was also given to the problems which are arising with the advent of higher secondary distribution voltages.

The morning session of February 3 was primarily devoted to presentations of new types of meters and metering equipment by various manufacturers.

E. H. Tyson stated that his company had completed a study of streamlining and centralizing meter records. A plan has been agreed upon by which records of meter location and "due date" for test of all single-phase meters with a dial multiplier of one will be discontinued in the Meter Department. This group consists of 90 per cent of the total installed meters. The machines in the Central Billing Department will furnish the Meter Department with stacks of routed work orders for changing meters as they become due for test, taken from data required to operate customers' billing records, which are a nearly complete duplication of the data carried on the former Meter Department records. In this company all single-phase meters are removed from service and tested in the shop. The benefits expected from this new method consist of reducing errors by stopping manual transcriptions on the Meter Depart-

ment file and a substantial reduction in operating expense.

Papers were presented by G. J. Yanda and E. H. Tyson on the economics of meter testing. The economics of operating on a "due date" or geographic basis for meter testing as applied specifically to the companies represented by these two members brought forth considerable discussion.

Watthour Meter Terminals

J. N. Schwartz reported the results of a study his subcommittee had made concerning the adequacy of present watthour meter terminals. It was the conclusion of the subcommittee that the survey replies and other observations concerning the question of terminals indicate the present terminal specifications provide a design adequate for most all sizes of meters. Exceptions are installations where large aluminum conductors are required to be brought into the meter and those in which the size of conductor matches the maximum thermal capacity of the 50-amp bottom-connected meter. Alternate types of construction and arrangements provide a satisfactory solution of the problem where the meter terminals are the limiting factor.

E. L. Keller reported that he was continuing his study of the cyclometer register for watthour meters. It was indicated that, although this type of register has certain advantages from a customer relations and billing standpoint, the recent increase in price differential for this type of register has made it less attractive to some companies.

K. S. Field reported that he had circularized the committee regarding corrosion of meters and affiliated equipment and the majority of replies indicated that the new methods of preservation being used for this type of equipment seem to have solved corrosion difficulties previously experienced. It is evident that continued joint efforts of the manufacturers and electric companies have resulted in real progress being made. This subject will be kept active in order to deal with any new problems along this line that might arise.

Considerable discussion was devoted to the subject of preparing and publishing a new educational course for metermen. The committee was of the opinion that such a publication would be timely and that sufficient source data exists within member companies in the form of educational pamphlets and instructions to provide the outline for such a publication. The subject was given to Division Chairman S. K. Brown for study and report.

A progress report was made on the revision of existing standards for watthour demand registers and thermal demand meters. It has become necessary to revise these standards in order to coordinate scale classes of demand meters with the extended load ranges of newly developed single-phase watthour meters.

The study of meter obsolescence received considerable attention. This will be the subject of a paper at the May meeting of the committee in Chicago.

Progress has been made in the preparation of standards for watthour meters. This subject is also under active consideration by a NEMA subcommittee, and it is expected that a joint EEI-AEIC-NEMA standard can be arrived at in the near future. The standards will incorporate practices which have become accepted by general usage through the years, including a number of design features requested of manufacturers at various times in the past by EEI committee action. The standards will also recognize the new single-phase meters now becoming available from various meter manufacturers, one with a load range of 100 amp and the other with a load range of 200 amp.

Furnishing Satisfactory Service

One of the outstanding features of the meeting was the talk given by J. B. Thomas, President and General Manager of Texas Electric Service Co., at the luncheon on Thursday. Mr. Thomas discussed the point of view of operating company management in regard to furnishing satisfactory service. He said that new low-power-factor low-diversity loads such as air conditioning have materially altered residential load patterns in the Southwest and will ultimately affect large areas of the country. In his opinion the cost of presently designed three-phase four-wire polyphase meters and accessories is prohibitive for installation on residential services, and the need for a more economical approach to such metering is critical. The suggestion was made that perhaps certain refinements in these meters were not justifiable.

Mr. Thomas commented further that in most electric companies there was need for more personal contact with the customer. A desirable method of metering and billing residential customers would be to provide the meter reader with some device whereby he could read the meter, prepare the bill, and personally deliver it and perhaps collect.

The next meeting of the Meter and Service Committee will be held jointly with AEIC Committee on Meter and

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Customer-Contact Training Kit Prepared by EEI-AGA

TO meet the need for a simple method of training customer-contact employees, a joint EEI-AGA Customer Relations Training Program has been specifically designed for the electric and gas industries.

The program, which will be available for distribution within a few weeks, is divided into three parts First is a supervisor's manual, which will serve as a permanent guide for those charged with training personnel in any form of customer relations. Prefaced with material to supplement the supervisor's experience, the manual contains five sections describing how the slide-films included in the program kit can be most effectively used. The manual also contains instructions for holding successful meetings, and a bibliography of source material.

The second part of the program consists of five sound slide-films, which cover (1) principles of customer relations; (2) fundamentals of good telephone practice; (3) the conduct of office contacts and interviews; (4) problems affecting employee conduct on customers' premises; (5) principles of good letter writing.

A packet of follow-up booklets complete the materials included in the program kit. These booklets, which deal with the same subjects covered by the slide-films, are intended for distribution to employees who participate in the program.

Based upon a production cost of nearly $100,000, the program will be priced at $300, or less, depending upon the volume of purchase orders.

Transmission and Distribution Committee Meeting

J. W. Anderson, *Chairman*

THE winter meeting of the Transmission and Distribution Committee was held on February 9-10 at the Hotel Cleveland, Cleveland, Ohio, with 205 members and guests in attendance.

Underground and Safety Groups

The Underground Group, sponsored by D. C. Hawley, featured a series of papers concerning development and application of aluminum-sheathed power cable. E. J. Merrell, Phelps Dodge Copper Products Corp., described the development of a practical design; E. C. Rue presented a paper by C. F. Avila outlining detailed plans for an experimental 3700-ft aerial installation of three-conductor, 350, mcm, 15-kv cable in Boston; and T. C. Duncan described an experimental 5000-ft underground installation of triplexed, No. 2/0, 27-kv cable being installed in New York. Advantages appear to be lighter weight, greater strength, and better resistance to fatigue, while disadvantages are need for a polyethylene jacket for corrosion protection, somewhat greater restrictions on bending, a more exacting wiping procedure, and a higher sheath loss in the larger sizes.

F. C. Marschner and T. C. Duncan described extensive cable salvaging and reconditioning practices followed in Detroit and New York. They agreed that their programs produce considerable economies and reported excellent performance records for duct splices that can be made in the reconditioning plant under ideal conditions.

H. L. Davis gave further details from the "Cable Operation Report" for 1952 which now is near completion. Cable troubles were somewhat lower, joint troubles about the same, and termination troubles somewhat higher than in 1951. However, no significant trends were indicated, and the general pattern of troubles is about the same as in recent years.

F. C. Marschner reported that the "A-C Network Operation Report" for 1950-1952 inclusive has been released for publication.

The Safety Group, sponsored by G. H. Fiedler, opened with an address by C. J. Beller, who outlined specific safety techniques employed by The Cleveland Electric Illuminating Co. in reducing its accident frequency rate from 23.3 to 3.4 in six years. These include regular, concrete expressions of executive interest in safety; promoting the philosophy of safety on the job and in the home in the company house-organ; distributing a detailed monthly safety memorandum to all employees on safety committees and subcommittees; establishing a safety staff with personnel in all principal operating divisions; organizing safety committees throughout the company, with rotating memberships that ultimately include almost all employees; establishing goals and contests; setting regular times for foremen to discuss safety with their men; careful analysis of all accidents, lost-time or not; promoting defensive driving, with recognition for safe drivers; and giving special attention to individuals appearing to be accident prone.

Mr. Fiedler led a panel discussion by R. I. Amson, R. N. Coe, A. Douglas, R. M. Grogan, D. C. Hawley and W. J. Witte on underground system safety practices. Items covered included gas detection practices, the use of rubber protective equipment, hold-off and cable-identification procedures, and fire-fighting methods.

Overhead Group

The Overhead Group, sponsored by M. H. Pratt, devoted most of its session to aerial cable.

E. R. Streed described applications of aerial cable by the Delaware Power & Light Co. Twelve-kv primary cable has been used in one case to bring six feeders from a generating plant through a congested area. These consist of three, 400-mcm-copper, single-conductor, ozone-resistant-rubber-insulated aluminum-bronze taped cables, twisted and bound to an extra high strength copperweld messenger. Triplex No. 2 all-aluminum polyethylene-insulated cable now is standard for single-phase services, and triplex No. 2/0 all-aluminum neoprene-insulated cable with a bare No. 2/0 ACSR neutral now is standard for secondaries.

E. W. Davis, President of IPCEA, conducted a symposium by cable-manufacturer representatives on aerial cable for primary distribution. F. C. Van Wormer, General Electric Co., discussed economic aspects, outlining specific examples where the extra load carrying ability of cable and attendant reduction in substation costs help offset considerably greater installation costs. R. C. Waldron, Okonite Co., described the evolution of aerial cable design to the present types. Currently preferred construction for primary distribution is three rubber-insulated conductors, shielded with tinned-copper tape for voltages above 5 kv, covered with a neoprene jacket, twisted together and bound to a copperweld messenger. Aluminum conductors and aluminum sheaths promise further advances in the art.

D. A. Silvers, General Cable Corp., discussed features of the tentative IPCEA specifications for rubber-insulated preassembled aerial cable, 15 kv and below. W. P. Holben reported that these tentative specifications now are being studied by a subcommittee of the Transmission and Distribution Committee. G. J. Crowdes, Simplex Wire and Cable Co., described the various methods of installing aerial cable, outlining the advantages of preassembled, self-supporting, and field-spun cables over the traditional messenger and ring arrangement. He particularly stressed the flexibility, precision and excellent appearance of field-spun installations.

F. W. Myers reported that arrangements have been made to utilize the facilities of the Armour Research Foundation in making a preliminary study of the problems associated with aluminum conductor fittings. (See page 52 of the February, 1954, BULLETIN.)

L. J. Weed described a method of obtaining distribution-transformer load data from meter-book readings, which has reduced costs to 40 per cent of those for actual load tests.

Standards and Specifications Group

Activities of the Standards and Specifications Group, sponsored by W. L. Vest, Jr., were outlined by the subcommittee chairman.

W. P. Holben reported that proposed TD-14, "Specifications for Moulding Staples," is about ready to be released for printing. Balloting for a proposed revision of existing specifications for strand-eye anchor rods has just been completed, and proposed revisions of other existing specifications for eye-nuts and eyelets, steel crossarm braces, and bolt-type steel insulator pins are about ready for balloting. Work is continuing on proposed new specifications for expansion shields for galvanized lag screws and machine bolts, insulated clevises and wireholders, as well as revisions of several of the older existing specifications.

E. T. Coupal reported that study of the adequacy of the interrupting ratings of heavy-duty cutouts is continuing. Investigation of industry requirements for standardization of reclosers is also planned.

F. A. Ashbaugh reported that proposed specifications for Douglas-fir heavy-duty crossarms and braces soon will be submitted to members for ballot. Good progress is being made on proposed specifications for locust pins.

F. E. Moesta reported continued progress on proposed EEI-NEMA street-lighting equipment standards for insulator-head and reflector interchangeability and a revision of the existing standards for metal-head and reflector interchangeability. Work also is continuing on other proposed standards for steel luminaire supports, high-voltage controllers and film cutouts.

T. C. Duncan reported continued progress on the proposed specifications for solder-sweated split tinned-copper connectors to replace existing specification TD-8. Work on a new specification for compression-type cable connectors is in an early stage.

General Engineering Group

The General Engineering Group, sponsored by W. M. Penney, covered a variety of subjects.

W. C. Phillips reviewed activities concerning mobile radio systems, including the FCC proposal to establish license fees as outlined in the February 3 issue of the *Federal Register*.

T. C. Duncan discussed the recent trend toward higher secondary voltages for industrial plants and large commercial buildings that has led to establishment of a new subcommittee whose immediate objective will be to determine the most suitable standard voltage level in the 400- to 500-v range. Although this will be primarily for industrial and commercial application at present, full consideration will be given to future application to all classes of load. A portion of the next committee meeting is to be devoted to discussion of this subject.

Professor E. D. Ayres, Ohio State University, discussed the present status of engineering economics, pointing out that there are several unresolved areas of disagreement on valid methods and that the utility industry also has a number of unique features which affect economic studies of its operations. Hence there is a great need for a continued search for improved methods and for more interchange of ideas in order to give the engineer greater confidence in handling such studies.

C. J. Beller reviewed a preliminary report of the AIEE-EEI Joint Working Group on Coordination of Construction and Protection of Distribution Circuits covering a statistical analysis of the performance of sample urban, suburban, and rural circuits, 5 kv and below, of over 30 companies for the period 1949 through 1951.

R. M. Havourd presented results of tests on the burn-down characteristics of overhead-distribution conductors, emphasizing the need for development of a reasonably priced means of removing short circuits within 1.5 to 2 cycles. Otherwise, burn-down of covered conductors will continue to be a problem.

W. M. Penney reported that in view of the increasingly serious problems created by the low power factor of air-conditioning equipment, the Union Electric Co. of Missouri has notified manufacturers and dealers that it will require room air conditioners installed in its service area after January 1, 1955, to have a minimum full load power factor of 90 per cent.

It was also noted that some 1954 models of room air conditioners provide simultaneous starting of fan and compressor motors resulting in locked rotor currents exceeding those recommended in AEIC-EEI-NEMA Single Phase Motor Starting Current Rules and that thermostatic control is being provided as standard or optional equipment on several models with locked rotor current values designed for manual control.

Employee Opinion Surveys

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most dissatisfied with what most immediately affects them—direct supervision and working conditions. Numerous improvements in this field have been introduced by various companies. Often these were done quietly and unobtrusively, but they were none the less effective.

6. One of the most interesting and successful plans of action consisted of conducting a series of group meetings at which the supervisor and his employees discussed survey findings and considered remedies. While this was done, a noticeable improvement in morale resulted, as measured by a subsequent survey.

A final question remains, Do the companies that have conducted surveys and taken corrective action feel that results justify the effort and expense? The answer as far as employee morale is concerned is a positive "Yes." That is to say, in those cases where results have been measured, the outcome has generally been favorable.

It is at this point that the question of increased production usually enters. Does improvement in morale effect increased production?

The answer to that one is clouded by the difficulties involved in measuring production. Numerous studies on the subject have been conducted, some of which give an affirmative answer, while others are inconclusive. And so the question continues to be debated. There are those who say that there is ample evidence that improved morale does increase production, and there are those who say that the evidence is suspect. And there are also those who are coming to believe, as they continue to study the matter, that the question is to a considerable extent irrelevant.

Recent EEI Publication

I Want to Know About the Electric Industry

EEI Pub. 53-13. 1953 Edition. Price: 25 cents. Quantity prices upon request.

In its sixth annual edition, this booklet consists of single-page presentations of 28 questions frequently asked the Institute, with a brief answer and tabular and explanatory material for a more extended answer to the question posed.

Personals

James E. Harsh, Chairman of the Board, The Empire District Electric Co., was honored for his 50 years of service with Empire and its former associated companies in the Cities Service organization when he received a special lapel pin recently at the company's annual employee party. D. C. McKee, Empire President, made the presentation.

The first member of the company to achieve the half-century milestone of service, Mr. Harsh joined Denver Gas and Electric Co. in 1903 after attending Oklahoma A. & M. College. Upon formation of Empire in 1909, he became that company's first commercial sales manager and three years later went to Sadalia, Mo., to organize a sales department for City Light and Traction Co. In 1914 he became vice president and general manager of Salina Light, Power and Gas Co. and in 1917 joined Lincoln Gas and Electric Co. in the same capacity.

After heading Virginia Power Co. for several years, he returned to Empire in 1925. He was elected president in 1940, becoming chairman of the board in 1948.

Paul D. Brooks, Sales and Market-Department Manager, Ebasco Services Inc., has been elected Commercial Vice President of American Gas and Electric Service Corp., succeeding the late **Philip Torchio, Jr.** He was also elected to the board of directors.

An electrical engineering graduate of the University of Tennessee with a B.S. degree, Mr. Brooks served as a commercial sales engineer for Tennessee Public Service Co. while still attending college in 1928 and 1929. Upon graduation he was made supervisor of the company's rural development. After various assignments, he was named general sales manager in 1936. Two years later he joined Ebasco Services as a sales sponsor, becoming assistant manager of the Sales and Marketing Department in 1944 and department manager in 1950.

As a result of the retirement of **John A. Herlihy,** Vice President and General Manager, Boston Edison Co., a number of major organizational changes have been announced. Mr. Herlihy had served the company for more than 40 years.

S. Murray Jones, Director of the Rate Administration and Research Department, has been appointed Assistant to the President.

Dale E. Washburn, in his new position as Assistant Vice President and Commercial Manager, will have jurisdiction over the Commercial and Procurement Organization, which will be comprised of the Purchasing, Rate Administration and Research, and Sales Departments. The Procurement, Stores, and Service Organization, formerly headed by Mr. Washburn, has been discontinued and its functions redistributed.

Named as Staff Assistant and Director of Stores and Service was **Thomas J. Galligan, Jr.**

Albert J. McNulty, Superintendent of the General Accounting Department, will retain his present duties and, in addition, assume the post of Controller.

The Superintendent of the Financial Estimating and Planning Department, **Ralph M. Kelmon,** also will retain his present duties as well as assuming those of Assistant to the Treasurer.

Harvey E. Bruce has been appointed Chief Accountant of Jersey Central Power & Light Co. He is a graduate of Bentley School of Accounting and Finance and previously served as examiner of accounts for the Federal Power Commission, Washington, D. C.

Fred L. Mikelsen, Insurance Agent, Utah Power & Light Co., has been appointed Assistant Secretary, succeeding the late **Ferris Thomassen.** In his previous position since 1951, Mr. Mikelsen was first employed by Utah Power & Light as a typist, becoming secretary to a vice president, and secretary to the president, successively.

Arbie B. Tye, Statistics and Budget Supervisor in the Treasury and Accounting Department of The Washington Water Power Co., has been named Assistant Treasurer, succeeding the late **William H. Hansen.**

A 1929 Northwestern Business University graduate, Mr. Tye joined the company in 1930 as a clerk in the Accounting Department. Through the years he served successively as senior accountant, associate accountant, budget accountant, supervisor of budgets, and statistics and budget supervisor, his last position. Mr. Tye is active in various social and civic organizations.

D. H. Riley, Assistant Manager of Power Production for West Penn Power Co. since 1952, has been promoted to Manager of Power Production in charge of operation, maintenance, and minor construction at generating stations.

A graduate of Webb Institute of Naval Architecture, Mr. Riley began his career with General Engineering and Management Corp., followed by a 15-year association with Jersey Central Power and Light as technical and results engineer. In 1943 he joined Union Carbide and Carbon Chemical Co. at the Oak Ridge atomic energy plant, being made superintendent of power in 1946. He was responsible for generation and distribution of all power in the Oak Ridge operations area. Mr. Riley was associated with Ebasco Services, Inc., in a consulting capacity before joining West Penn in 1952.

Meter and Service Committee Meeting

(Continued from page 93)

Service Methods on May 3-4, 1954, at the Edgewater Beach Hotel in Chicago. This meeting will be held concurrently with the other Engineering Division committee meetings. The time will be devoted mainly to presentation and discussion of papers on subjects of general interest from a management rather than a technical standpoint, including meter obsolescence and economics of meter testing. It is also anticipated that some time will be given to subjects of common interest to the Transmission and Distribution Committee. There will be no formal presentation by manufacturers.

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(Terms Expiring 1955)

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(Terms Expiring 1956)

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B. L. ENGLAND.....Atlantic City Electric Co., Atlantic City, N. J.
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